WEEKLY BULLETIN

OF THE OFFICE OF

WESTERN IRRIGATION AGRICULTURE,

BUREAU OF PLANT INDUSTRY,

U. S. DEPARTMENT OF AGRICULTURE.

Volume IV.

WEEKLY BULLETIN,
Bound Volume of.

With this issue of the Bulletin is begun Volume IV. Bound copies of Vol. III will be sent out within a short time. Volume II assumed such proportions that it was deemed expedient to make two volumes a year instead of one, and the middle of the calender year has been decided upon as the logical point of division.

AUTHORIZATIONS.

Operating authorizations for the fiscal year 1914 have been sent out. In this connection attention is called to the explanation of the present method of handling authorizations on page 213, Vol. II of the WEEKLY BULLETIN. Details contained in former operating authorizations are now blanketed under the clause "in accordance with the Fiscal Regulations of the Department", and consequently greater familiarity with the Fiscal Regulations on the part of field men is required.

PERSONAL.

Mr. Scofield returned to Washington June 22 and on the 23rd resumed his duties in charge of the office.

Mr. Farrell returned to Washington July 1.

5 July, 1913.

Truckee-Carson.

FIELD NOTES.

The maximum temperature for the week ending June 21, was 83.9, minimum 46.4.

Mr. Headley was taken sick with appendicitis Sunday evening, June 15th, and was operated on, Monday monning at 10:00 o'clock. He is improving rapidly and expects to be on duty in a week or ten days.

Haying is in progress throughout the valley and from present indications the crop will be very heavy.

A report from the Reclamation Service states that the Truckee River is almost dry and the flow of the Carson River is falling off rapidly. There will be practically no water for alfalfa during the remainder of the season.

Umatilla.

The maximum temperature for the week ending June 21, was 89, minimum 44.

The work on the grape trellis in field B5 was continued during the first part of the week.

Work was continued on the inside roads during the entire week.

Mr. Allen returned Tuesday, from his trip, to California.

The weather has remained cool and things generally are making a rapid growth.

5 July, 1913.

FIELD NOTES.

Yuma.

The fourth successive planting of seven grain sorghum varieties was seeded to A-4 and D-26.

The first cutting of alfalfa from spring seeded borders E-1 to 6 was harvested.

The thinning of Egyptian and Durango cotton experiments has been continued on various plats.

Orchard lands on the station, including figs from C-8 to 17, dates D-16 to 21 and deciduous fruits B-25 to 31 were irrigated and cultivated during the week. Newly transplanted dates on borders A-16 and 17 are being watered every week.

Seven hundred Eucalyptus rudis plants were received from the Armstrong Nurseries and potted to be held a few weeks and then transplanted to roads on the west and south of farm.

The leveling of a forty foot strip of land on the south line has been nearly completed during the week in preparation for the date and Eucalyptus plantings which will outline the farm road. The laying off of this road necessitated the construction of a new ditch leading to the low-lying lands on D series.

Messrs. Cook, Doyle and Taylor arrived at the station Saturday. Mr. Melvin Buster arrived at the station the 16th to assist in cotton experiments.

Huntley.

A rainfall of 0.85 inch was recorded during the week of June 28.

On Monday the alfalfa from field K was hauled in. Light showers almost every day after Monday stopped hay hauling and the crop is becoming damaged, all of it being cut and in the field excepting that in field K.

Alfalfa plats in K were irrigated, corn in fields K and H was thinned, and the remainder of the time was spent in weeding, building culverts and turnouts and hauling lumber for the addition to the bunk house.

12 July, 1913.

FIELD NOTES.

San Antonio.

The maximum temperature for the week ending June 28 was 94, minimum 70; greatest daily range 22. The week was one of constant showers, the total precipitation being 1.67 inches, making field work impossible except for about two days.

Between rains sufficent time was available for cultivating the cotton, orchards, and fallow land. Plats A5-16, A5-6 and 7 were plowed.

Sudan grass from B4-14 was drawn in, the yield being at the rate of 4200 lbs. per acre for the first cutting. The grass is now making good growth and promises a good yield the second cutting.

Crops on the farm and on surrounding farms are looking excellent, the recent rains being very favorable to the development of corn and sorghums. Cotton has made excellent growth during the last two weeks, but damage from boll weevil is feared if the moist weather continues. Already serious boll weevil damage is reported from some localities.

Messrs. Ray Johnson and Harold Clarke arrived at the station on June 19 to take up work for the summer in cotton investigations. Mr. Meade left Saturday, June 28, for Greenville and Clarksville, Texas, Tennessee, South Carolina, and Washington, D. C. Mr. J. H. Kinsler was at the station one day during the week. Mr. Hastings made a trip to Boerne and Kerrville, Texas for the purpose of collecting herbarium specimens of native plants.

Belle Fouche.

The maximum temperature for the week ending June 28 was 98, minimum 49; precipitation 1.20.

The alfalfa in fields O & P was cut and hauled in; yield per acre, 1 ton.

The oats in O & P have been irrigated.

The irrigation of flax, grain varieties, oats and wheat in the irrigated rotations was finished, and the irrigation of alfalfa commenced.

Balance of time was spent in cleaning roads and alleys, and weeding alfalfa plats seeded this spring.

12 July, 1913.

FIELD NOTES.

Yuma.

During the week of June 28, considerable time has been consumed in cultivating and hoeing. Cotton, grain sorghums, broom corn, hemp, pomegranates, and dates were cultivated. The date and Eucalyptus plantings along the farm roads were hoed; also weeds were hoed from irrigation laterals on the farm.

The first cutting of alfalfa was harvested from the late spring plantings on A-6 to 9.

The row of Eucalyptus rudis trees on the north and east of the farm was summer pruned. These trees are making very rapid growth this season.

Notes from vegetables grown for mess garden at the station show the following comparisons. Their yields will be reported later. Of six varieties of early potatoes grown Irish Cobbler and Early Ohio are much the best producers. Irish Cobbler matures earliest of any.

The first ripe tomatoes of the season are Dwarf Champion and Burbanks Quarter Century.

Emerald Gem muskmelons have been ripening for two weeks. Rocky Fords of the same planting date are not yet ripe. A late planting of Bidwells Casaba, Chilian and Kleckley Sweet watermelons were planted this week on C-19.

The first sugar beets in the valley were pulled this week.

The Reclamation people are reconstructing the fence on the south line of the farm.

Huntley.

During the week of June 21, part of the alfalfa from field K was hauled in. Most of the first crop of hay was damaged somewhat by a heavy rain on June 18.

Alfalfa in Fields B and D was mowed the latter part of the week. Spring grain in Fields K, M, and C was irrigated.

12 July, 1913.

FIELD NOTES.

Scottsbluff.

During the week of June 28 the temperature was about normal. Local showers were reported here every day and as a result much of the first cutting of alfalfa hay was wet.

The alfalfa on the irrigated rotations is being irrigated for the second time. The sugar beets have all been hoed over once.

In the dry land rotations the alfalfa and brome grass were cut June 23. The yields will be reported later.

The general work consisted in hoeing potatoes, cutting alfalfa (June 27), and irrigating the small grain for the second time.

CIVIL SERVICE.

Employment Without Appointment.

The Officer in Charge of Records calls attention to the fact that in several instances recently vouchers have been received covering the employment of persons not under appointment for periods aggregating more than the thirty days allowed in one year. Farm superintendents are cautioned to exercise care in this respect, as the auditors give warning that hereafter all such overtime employment will be disallowed. In this connection attention is directed to page 174, volume II, of the Weekly Bulletin of November 9, 1912, wherein it is stated that the fiscal year will be considered as the period of one year during which the restriction of thirty days shall apply.

Alfalfa Eradication (continued).

1. Crowning.— Crowning consists of cutting off the alfalfa plants about 2 inches below the surface of the ground, or just below the crowns. Various crowning methods are followed. One is to crown the field late in the fall after the removal of the last crop, harrow thoroughly to expose the crowns to the effects of wind, sun, and low temperatures, and then replow in the spring to cut off the alfalfa plants that have survived and to prepare the land for the succeeding crop—usually potatoes or corn, but sometimes a small grain crop. The spring plowing is usually deep, 8 to 12 inches being the depth commonly plowed.

Another method is to crown in the spring, about the middle of May, harrow immediately to expose the crowns to the weather, and replow deeply about three weeks later in preparation for corn or potatoes. One farmer who has successfully followed this method believes its effectiveness is due to the fact that the plants are growing rapidly at the time of crowning and are therefore more susceptible to the effects of wind and drought than they are when they are crowned in late fall or early spring while the plants are dormant.

There is considerable difference of opinion as to whether it is best to crown when the soil is dry or when it is comparatively wet. The crowning is more easily done when the soil is not too dry, but some farmers state that the presence of abundant moisture opposes the desired drying out of the crowns. Both "moist" and "dry" crowning are practised with considerable success.

Various machines are used for crowning. The majority of farmers, probably, use simply well sharpened bottom plows. One man remodeled an old hand plow by changing the share and replacing the moldboard with one so shaped that the alfalfa sod is not turned completely over. This facilitates the harrowing out of the crowns. The share was made to run straighter—that is, more nearly at right angles to the line of draft—than on the ordinary plow. The share used is about 19 inches long from point to heel, and is so adjusted as to

Alfalfa Eradication (continued).

cut a furrow slice of 17 inches. This plow is drawn by two horses and crowns 2 to 3 acres a day, the depth of plowing being 1½ to 3 inches.

What appears to be a very promising crowning implement is a modification of the old Twin Falls Sagebrush Grubber manufactured by a local machinist at Twin Falls. This machine is essentially a V-shaped cutting edge mounted on a steel frame which is carried on two wheels about 3 feet in diameter. The "V" consists of a strong cast-steel point at the apex and two heavy shares which can be removed separately and sharpened like plow shares. Each share is 38 inches long and the machine cuts a 42-inch swath. Smaller or larger machines could be obtained if desired. The 42-inch machine requires 4 to 6 horses, depending on the nature of the soil and the thickness and age of the alfalfa to be crowned. The machine is patented. About 30 of these crowners are being operated in the Twin Falls country and they are reported to be highly efficient. The 42-inch crowner weighs 250 pounds and sells for $75.

(It was at first planned to use one of these machines in the experiments at Scottsbluff, outlined below, but it has been found that the manufacturers of the "XX Century Grader" make what they call an "alfalfa scalping attachment which works on somewhat the same principle as the Twin Falls Crowner, and as Mr. Knorr already has one of these graders the alfalfa crowning attachment will probably be used).

2. Special Methods of Plowing.--- One some of the farms in the locality visited special methods and times of plowing are being successfully tried in alfalfa eradication. One rather typical method is as follows:

The second cutting of the alfalfa to be eradicated is allowed to grow until ready to cut for hay. It is then (about August 1 to 10) plowed under 4 to 5 inches deep, special care being taken to see that the heavy growth of green material is

Alfalfa Eradication (continued).

well covered. Immediately after it is plowed the land is gone over with a smoother, which leaves a fine soil mulch on the ground. The purpose of this mulch is to reduce the air circulation through the mass of green material and so induce a high rate of decomposition of the vegetable matter. It is usually found that eradication is best secured when the soil contains an abundance of moisture, and so the land is ordinarily irrigated shortly before plowing. It seems that this practice is well founded, since rapid decomposition of the green material cannot take place in a dry soil. After the land is smoothed it lies undisturbed for about six weeks, when it is replowed 8 to 10 inches deep. The following spring it is double disked in preparation for corn, beets, potatoes, or a small grain crop.

There are some cases in which the third crop is treated in somewhat the same manner as is described for the second crop treatment. In some of these cases the replowing is done in the spring. If eradication can be effected by treating the third cutting, this method is to be preferred to the one described above, as it saves the farmer one cutting of hay. It is likely, however, that the weather during the latter part of the season would be less favorable to rapid decomposition than that of August and early September.

The experiments outlined below have been planned for the Scottsbluff Experiment Farm. In planning these tests it was desired to try all the principal methods which have been found successful in the Idaho country and to include some new methods and combinations. An attempt will be made to discover the least expensive effective method, and for this reason tests are included from which certain of the operations are omitted; as, for example, irrigation or harrowing. The following outline describes the 22 different methods of alfalfa eradication which are to be tested at the Scottsbluff Farm beginning this summer.

12 July, 1913.

Alfalfa Eradication (continued).

Experiments at Scottsbluff.

These experiments are to be conducted on Fields C and G, beginning in the summer of 1913, the treatments to be continued into the late spring of 1914, at which time the entire area under treatment is to be planted to sugar beets and treated uniformly. In this way two objects will be accomplished: (1) The effect of the various treatments on the alfalfa to be eradicated; and (2) the effect of each treatment on the crop following alfalfa. Twenty-two 1/10 acre plats will be used.

1. Plowing.
   A. Second crop irrigated just before treatment.
      a. Green crop plowed under 4 to 5 inches deep; smoothed; replowed 8 to 10 inches deep six weeks later.
      b. Stubble plowed under 4 to 5 inches deep; smoothed; replowed 8 to 10 inches deep six weeks later.
   B. Second crop not irrigated just before treatment.
      a.) Treated as under "A".
      b.)
   C. Third crop irrigated just before treatment.
      a.) Treated as under "A".
      b.)
   D. Third crop not irrigated just before treatment.
      a.) Treated as under "A".
      b.)
   E. Plowed 4 to 5 inches deep late in fall, after plants are dormant.
      a. Irrigated before plowing; replowed in spring.
      b. Not irrigated before plowing; replowed in spring.

2. Crowning.
   A. Crowned 2 inches deep, immediately after third crop is removed.
      a. Crowned; soil moist; harrowed; replowed in spring.

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Alfalfa Eradication (continued).

b. Crowned; soil moist; harrowed; replowed in fall.
c. Crowned; soil dry; harrowed; replowed in spring.
d. Crowned; soil dry; harrowed; replowed in fall.

B. Crowned 2 inches deep, late in fall when plants are dormant.
a. Crowned; soil moist; harrowed; replowed in spring.
b. Crowned; soil dry; harrowed; replowed in spring.
c. Crowned; soil moist; not harrowed; replowed in spring.
d. Crowned; soil dry; not harrowed; replowed in spring.

C. Crowned 2 inches deep, early in spring, plants still dormant.
a. Crowned; harrowed; replowed about four weeks later.
b. Crowned; not harrowed; replowed about four weeks later.

D. Crowned 2 inches deep, late in spring, plants green.
a. Crowned; harrowed; replowed about three weeks later.
b. Crowned; not harrowed; replowed about three weeks later.

Careful notes should be taken relative to the effects of the various treatments and covering such points as the following:

1. Relative ease of applying the treatment under the different conditions and at the different times.

2. The abundance of alfalfa on the different plats at the close of the treatment and during the year beets are grown.

3. Relative ease of cultivating the beets on the different plats.

4. The yields of alfalfa hay on the plats harvested before treatment in 1913; these yields should be reported separately by plats and crops—first, second, and third.

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Eradication of Alfalfa (continued).

5. Where the alfalfa grows immediately after the treatment is applied this should be noted; character and extent.

6. Full agronomic notes should be taken on the beets during their growth— the common agronomic notes, including stand, yield, etc. etc.

It seems that the above test should yield much valuable information on the subject of alfalfa eradication. Similar tests will be started on some of the other farms as soon as the necessary arrangements can be made. There can be no doubt that many of the farmers on the irrigated lands are losing money by failing to utilize fully alfalfa's soil enriching powers. This is probably due more to the difficulty of eradicating the crop than to any other cause. Any information we can obtain which will lead to more effective and less expensive eradication methods will be of very great value.

F.D.F.

19 July, 1913.

DAIRYING ON SMALL IRRIGATED FARMS.

During the past year there has been considerable discussion among the field men and among farmers on the various projects relative to the acreage of irrigated land required for successful dairy farming. It has frequently been contended that 40 acres of land is not sufficient for the support of enough dairy cows to warrant a farmer in going into the dairy business. The argument most frequently heard is that dairy farming without pasture is impracticable and that sufficient pasturage can not be provided on a 40-acre unit.

This is one of the subjects which the writer looked into on his spring trip in the West. The large number of instances found where dairying is being successfully followed on small farm units leaves on doubt as to the desirability of its wider application on the Reclamation projects. A few typical cases will illustrate what some farmers are accomplishing in this line and indicate some of the methods which could be employed by those who wish to engage in dairying on small tracts.

1. A farmer on the Truckee-Carson Project has 40 acres of land and milks 12 cows. It is a good average herd of grade Jerseys. The cows are fed alfalfa alone throughout the year, except for a very small amount of pasture on the uncultivated land adjoining the farm. This land produces a small amount of pasturage in those instances when an unusual rainfall occurs. The time the cows are turned out is practically negligible. Alfalfa is cut and fed green during the summer. The cows consume an average of 5 to 6 tons a year, about 1,000 pounds a month each. The farmer figures that the feed consumed by each cow would bring about $35 a year if sold in the local market. These 12 cows use 60 to 75 tons of alfalfa a year--a tonnage that is easily produced on 15 to 20 acres.

Dairying on Small Irrigated Farms (continued).

In 1912 the cream checks of the herd amounted to $1,280, or over $100 a cow. The cream is sold locally at prices ranging from 26¢ to 39¢ a pound of butter fat. In addition to these receipts, the farmer has the calves and skim milk. He stated that he would not sell his cows for twice what they cost him. He is one of the most prosperous farmers on the project and he appears to be entirely satisfied.

It is likely that his results would be better if he fed something besides alfalfa, and it seems that he should be making some money out of hogs. But he is satisfied with the returns from his cows on straight alfalfa, and he says he has been unable to make anything on hogs. A good way to look at the dairy business on these lands is to consider it as a means of disposing of the crops grown. This man figures that his cows pay him about $20 a ton for the alfalfa consumed. While he is probably not realizing as much as could be made by better feeding and a better use of by-products, he is proving that dairying on 40 acres is entirely practicable on the Truckee-Carson Project.

2. A farmer, owning only 20 acres of land at Jerome, Idaho, milks 10 cows--grade Holsteins and grade Jerseys. He feeds cured alfalfa hay the year around, with a little barley in summer and carrots and mangels in winter. The cows never leave the yard. All the barley, carrots, and mangels and most of the alfalfa are produced on the farm. The alfalfa which is purchased is bought standing at $2.00 a ton, and the farmer cuts and stacks it himself. The cows eat a trifle less than six tons each during the year.

This farmer sells butter to regular costomers at 35 cents a pound the year around. He does all his outside work and he and his wife attend to the butter making. They have no labor problem. During the month of May, 1913, he sold $139.70 worth

Dairying on Small Irrigated Farms (continued).

of butter. He feeds a few hogs on the skim milk and buttermilk. The cows average a little better than $120 a year each in butter sales.

It should be stated that this farmer is making a business of dairying. He has selected his cows with great care, and they are good grade cows. He likes his work, gives it his best attention and thought, reads dairy publications, and is very successful. He has no desire to sell his place. In fact, we has plans of improving his herd and his farm which he does not expect to complete in less than 10 or 15 years. His case is particularly interesting because of the small acreage of land and because he feeds dry alfalfa throughout the year.

3. Near Buhl, Idaho, on the Twin Falls South Side Tract, is a farmer who milks 27 head of purebred Holsteins. In summer this farmer feeds only green alfalfa, which he cuts each morning. In winter he feeds alfalfa hay and mill stuff--bran, shorts, and rolled barley. In 1912 he cut his green-fed alfalfa five times. From May 15 to June 19, 1913 (the date of the visit) 10 acres of alfalfa had fed the 27 producing cows, 20 head of calves and yearlings, 6 horses, and 10 sheep. The last strip of the 10-acre field had been cut on the morning of June 19, and the strip cut on May 15 was about 18 to 20 inches high--ready to cut again. The farmer figures that he keeps an equivalent of at least 4 cows per acre during the green feed period -- May 15 to October 1. During the winter the cows eat about 1,000 pounds of alfalfa hay per month each.

There has been no difficulty with bloating on green feed. In the spring the green material is given the cows very gradually, a small but increasing quantity being fed each morning for a few days, after the cows have had a full feed of dry hay. After about a week of this cautious

Dairying on Small Irrigated Farms (continued).

feeding the cows are put on a full ration of green feed, but they are fed regularly three times a day and not allowed to get gaunt.

In 1912 these cows averaged 360 pounds of butter fat-- about one pound a day each. The cream is sold to local buyers. The price ranged in 1912 from 26 to 40 cents, the average being about 30 cents. In addition to the cream sales, the farmer sold $700 worth of hogs in 1912.

He has 80 acres of land, but wishes to sell 40 acres, as he says 40 acres is all he needs, and any additional land only complicates his labor difficulties. Except at harvest time, he hires only one man, and he says his labor problem will be solved when he sells half his land. His case is interesting because of his use of green feed. The advantages of this method may be summarized about as follows:

1. It results in high milk yields.
2. It economizes on land and on the labor of land cultivation.
3. It stablizes labor requirements.
4. It gives a control of the cow's output, as there is no unpreventable variation in the feed, as there may be when the cows are pastured.
5. It prevents waste of feed.

4. Near Rupert, on the Minidoka Project, a farmer owning 40 acres of land is milking 17 cows-- some purebred and some grade Jerseys. This farmer pastures his cows on 10 acres of land planted to mixed grasses, and in addition to this feeds a small quantity of alfalfa hay at night and a very small quantity of bran at milking time. In winter he feeds alfalfa and bran.

He sells milk entirely, in the town of Rupert, at 7 cents a quart. In May 1913 his sales brought $217, and most of his cows are approaching the end of their lactation periods. The farmer breeds so

Dairying on Small Irrigated Farms (continued).

as to get maximum production during the winter months, the cows dropping their calves in September. More about this farmer's methods will be mentioned in a later bulletin, in connection with pastures. The main point of interest at present is that the farmer is successfully dairying on 40 acres.

5. Another farmer is milking 21 cows-- grade Holstein and grade Jerseys-- near Buhl, Idaho. He has 40 acres of land, of which 10 acres is in pasture of mixed grasses. He feeds alfalfa hay in addition to pasturing, and in winter feeds alfalfa hay and grain. He buys about half the grain used and an average of 15 tons of alfalfa a year. He has about 3 acres of orchard on his place, and he raises enough hogs to pay for all the cow feed bought. The cream sales average a little above $100 a year per cow. Seven years ago this farmer came to Idaho from Kentuchy without capital, and worked as a day laborer. Today his farm and cows are paid for and he says he is indebted to his cows for his success.

A number of other farms were visited where dairying is being successfully followed on small farm units. The above instances are sufficent to illustrate the possibilities in a general way. They show that units of approximately 40 acres are sufficiently large, and they illustrate three general methods of procedure, namely, pasturing, feeding alfalfa hay, and feeding green alfalfa. One of these methods or some combination of two or all of them can certainly be made to provide ample rough feed for dairy cows on the irrigated lands. It is noticeable that where dairy farming is being practised, there is a decided tendency to reduce the size of the farm units. When the Twin Falls South Side Tract was opened for settlement less then ten years ago, the farm units were from 80 to 160 acres. Today the average size of the farm is 60 acres, and this is expected by the

Dairying on Small Irrigated Farms (continued).

leading men of the locality to be reduced to 40 acres within the next 5 or 6 years. As the dairy farmer increases his efficiency, he finds it advantageous to reduce his farm area, largely because the reduction simplifies his labor problems.

There is sufficient difficulty about dairy farming to insure practically against overproduction, so that it is not likely that the prices of dairy products will fall materially in the near future. To succeed requires close attention to details, good cows, good bulls, and careful management throughout. There can be no doubt that, with proper care in selection and handling, the dairy cow furnishes one of the best markets for the most plentiful crop products of the irrigated lands; and there can be no doubt that in the majority of localities 20 to 40 acres of land will be sufficient to support as many cows as the average farmer is able to care for properly. F.D.F.

FIELD NOTES.

San Antonio.

The maximum temperature during the week ending July 5 was 94, minimum 70; greatest daily range, 24. The total precipitation was 0.98 inch.

Field work was impossible the greater part of the week because of the frequent showers. After the rains the cotton, orchard, and fallow land were cultivated.

Mr. Hastings made a trip into the coast country during the first part of the week in company with Mr. J. H. Kinsler. On his return to the station he left immediately for Washington and eastern points.

19 July, 1913.

FIELD NOTES.

Scottsbluff.

During the week July 5 the greater portion of the hay was put up. On account of the crowding of the plat work the hay cutting was strung out considerably.

On Tuesday the alfalfa plats in the irrigated rotations were cut, as well as the plats in the irrigation experiments.

Potatoes and sugar beets are being hoed and ditched in order to begin irrigating next week.

Nearly all of the small grain has been irrigated for the second time. The grain is well headed out and may not require another irrigation this season.

The yields of hay on the dry land plats were as follows:

Rotation	Plat.	Kind of Hay.	Weight.
10	B	Brome	130
12	C	"	115
41	A	"	125
41	B	"	115
42	A	Alfalfa	50
42	B	"	25

Corn is beginning to twist badly on the dry land.

Mr. Zook was at the station doing some corn work during the week.

Truckee-Carson.

During the week of June 28 the maximum temperature was 75, minimum 47.9.

During the week the men were engaged in cutting and shocking hay, thinning sugar beets, hoeing and weeding out the corn, and cutting alfalfa along the ditch banks.

19 July, 1913.

FIELD NOTES.

Belle Fourche.

The maximum temperature during the week ending July 5 was 87, minimum 21; precipitation, 0.02 inch.

The irrigation of the grain, alfalfa, and flax was completed July 3.

All row crops were cultivated during the week and potatoes were sprayed.

All the trees were gone over with the spring-tooth harrow.

The three hogs that have been pastured on alfalfa in Rotation 65, Field A, Series III, Plat 17, were weighed. Following are the results: Number of days pastured, 39; weight of hogs when turned in, 460 pounds; gain, 90 pounds, @ .07¢ (local market price), $6.30; ground feed consumed, 240 pounds @ 1.25 cwt. (equal parts of wheat, barley and oats) $3.30. At this rate the value of the alfalfa would be $13.20 an acre for the 39 days.

Umatilla.

The maximum temperature during the week ending July 5 was 88, minimum 52; greatest daily range, 28.

The weather has been cloudy during the greater portion of the week.

The team was kept busy during the entire week on miscellaneous work such as hauling manure, cultivating, plowing, and hauling supplies.

An Oliver No. 23, two-way riding plow has just been tried out and was found to give very good satisfaction for use in irrigated plats. It is equiped with very handy mechanical devices and is strong and durable. The great convenience of this and similar implements renders them of particular value for use on irrigated farms. The success of this implement warrants a recommendation that their use be considered on those experiment farms that have as yet not given them a trial.

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FIELD NOTES.

Huntley.

During the week of July 5 hauling in of the first crop of alfalfa was completed and some of the yields are given herewith. Most of the crop was very badly damaged by rain.

A time-of-cutting test which is being conducted on Field A-I, in which alfalfa is cut on five different dates, resulted as follows for the first crop.

Plat number.	Date cut.	Yield.	Average. Yield.	Average. Height.
A-I- 6	June 5	1.96		
11	" 5	1.77	1.86	30 in.
7	" 10	2.54		
12	" 10	2.13	2.33	32 "
8	" 14	2.00		
13	" 14	1.84	1.92	32 "
9	" 20	1.43		
14	" 20	1.73	1.58	34 "
10	" 25	2.59		
15	" 25	2.70		
16	" 25	2.25	2.68	36 "

The above results, obtained from the first crop, mean comparatively little of themselves. The real effects of cutting at different dates will not be known until the entire season's work is completed.

The method-of-planting test with alfalfa, which was last discussed on page 168 of Vol. II of the WEEKLY BULLETIN, gave the following results with the first crop of 1913, which was harvested on June 12 and 13:

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FIELD NOTES.

Huntley (continued).

Field A-IV, test begun in 1911.

Plat number.	Planted.	Yield, tons per acre. Individual.	Average.
A -IV- 1	With nurse crop	2.13	
5	" " "	2.12	
9	" " "	2.32	
13	" " "	2.40	2.24
2	Early, alone	2.02	
6	" "	2.26	
10	" "	2.14	2.14
3	Late, alone	2.19	
7	" "	2.36	
11	" "	2.24	2.26
4	In 18-inch rows	2.07	
8	" " "	2.04	
12	" " "	2.06	2.06
	Field A-III, test begun in 1912.		
A-III- 1	With nurse crop	1.52	
5	" " "	1.38	
9	" " "	1.30	
13	" " "	1.99	1.55
2	Early, alone	1.70	
6	" "	1.96	
10	" "	1.96	1.87
3	Late, alone	1.73	
7	" "	1.81	
11	" "	1.87	1.80
4	In 18-inch rows	1.25	
8	" " "	1.36	
12	" " "	1.45	1.35

19 July, 1913.

FIELD NOTES.

Huntley (continued).

It will be noted that the tendency for the yields to converge as the age of the alfalfa increases is even more marked on Field A-IV this year than it was in 1912. (See WEEKLY BULLETIN, Vol. II, pages 168-169).

It is seen that, in the first crop of the second year on Field A-III, planting alone is better than planting with a nurse crop or planting in rows, and early planting is better than late planting. These results are in accord with those obtained in 1912 with the three cuttings made on Field A-IV.

Yield of Alfalfa on Field K, first crop, harvested June 12, 1913.

Rotation number.	Plat number.	Tons. per acre.
67	K- II- 1	2.72
67	K- II- 2	2.44
61	K-III- 1	2.54
61	K-III- 2	2.10
60	K-III- 7	2.54
60	K-III- 8	2.37
40	K- IV- 1	2.35
42	K- IV- 7	2.51
44	K- IV-11	2.24
8	K- IV-22	2.38

Truckee-Carson.

During the week of July 5 the maximum temperature was 99, minimum 43.

The stacking of alfalfa hay was completed and

FIELD NOTES.

Truckee-Carson (continued).

following are the yields by fields:

Plat.	Area, acres.	Yield, pounds.	Yield per acre, pounds.
Z - 2	.25	1850	7400
3	.25	1450	5800
4	.25	975	3900
5	.25	1050	4200
6	.25	1050	4200
7	.25	1000	4000
D - 3	.54	1125	2080
4	.54	1200	2220
5	.54	1500	2780
6	.54	150	278
9*	.43	1725	4000
10	.43	175	407
F - 6	.37	2125	5750
10	...	....	....
11	.44	400	910
12	.76	4650	6120
13	.60	1540	2570
14	.60	3475	5800
16	.52	3075	3920
17	.43	1675	3900
18	.37	2650	7160
19	.35	2125	6075
20	.35	1555	4450
21	.35	1575	4500
22	.32	240	750
23	.32	1050	3280
24	.32	860	2690
25	.32	800	2500
26	.32	950	2970
27	.32	400	1250
29	.39	1300	3340
30	.39	1275	3270

* D-9 is sweet clover.

26 July, 1913.

EXPRESS.

Attention is called to an item under above heading on page 124, Vol. 1, of the Weekly Bulletin of January 20, 1912, wherein it is stated that arrangements have been made with the various express companies whereby their agents will turn over to our farm superintendents express shipments on which there are charges without collecting the cash, the agents fowarding the necessary data to their general offices to be included in regular bills to the Department.

Liabilities of this kind should be reported to this office by the farm superintendents by letter, giving the weight and contents, the name of the consignee and consignor, the point of origin, destination, and the amount of the liability.

PERSONAL.

Mr. Scofield is at present on a month's furlough for the purpose of continuing in the nearby Eastern States the Morganthau expedition begun last spring. He will return to duty about August 8, but in the meantime will keep in close touch with the office.

Within a few days Mr. Farrell will start on a trip to the field. His tentative itinerary extends to about September 21 and includes Minneapolis, Huntley, Belle Fourche, Mitchell; Powell, Wyo.; Okanogan, Wash.; Umatilla; Wieser, Idaho; Ogden, and Greeley, Colo.

Mr. Hastings is at present at his old home in Vermont, having been called there by the serious illness of his wife just as he was starting to Washington on his annual trip.

Mr. Blair will leave the Yuma Farm within a short time for a trip to Washington and various State Experiment stations in the Middle West.

26 July, 1913.

PLACING DAIRY COWS ON IRRIGATED FARMS.

In October, 1912, the writer sent to Mr. Scofield a letter discribing three methods which had been followed in financing the importation of dairy cows to be placed on the irrigated farms in south Idaho. The information in this letter was thought to be of interest to the field men on some of the projects, and copies were sent to them. Additional copies can be furnished to those who wish them.

Observations were made in Idaho during the latter part of June, 1913, as to what progress was being made with the cows imported in 1912, and some facts were secured relative to some more recent importations.

It appears that the 1912 importations are giving excellent satisfaction. The Kuhn interests, which are financing several irrigation projects in Idaho and California, had charge of the importation of about 500 grade cows in 1912, the cows being sold to farmers on the Twin Falls North Side Tract. The company advanced $30,000 to the farmers who bought cows. These farmers gave their notes drawing 8% interest and payable in monthly instalments, each instalment being one-half the amount of the monthly cream check. The average number of cows purchased by each farmer was about 5, although a few bought as many as 10 or 12. The average cost of the cows to the farmers was $71 a head. This included the original purchase price and the expense of selection and shipment from Wisconsin points. The Kuhn representative stated that many of the farmers have already paid their notes in full, and that practically all had paid more than half the indebtedness. Butter fat was selling at about 31 cents on the North Side Tract.

In January, 1913, an importation of 100 grade Holstein cows was made for the farmers of the Minidoka Project, Idaho. These cows were purchased in Utah, at prices ranging from $50, for 2-year old heifers, to $87 for mature cows. To this cost was added the importation expense of $3 a head. The cows were distributed, 4 or 5 in a place, to se-

Placing Dairy Cows on Irrigated Farms (continued).

lected farmers on the Minidoka Project. Up to date, the progress made has been very satisfactory. The importation was financed by five banks on the Project. Some of the terms are indicated in the following application form:

APPLICATION.

....., Idaho,.....1913.

I hereby apply to the Minidoka Cooperative Association for the purchase of the dairy stock listed below to be imported to the project and disposed of to me without profit.

It is understood that if my application shall be accepted by the Association, I will within ten days from date of notice of such acceptance deposit with the (Bank).....of.....,Idaho, not less than ten dollars ($10.00) for each animal for which my application may be accepted, such deposit to be considered as part payment on the purchase, the balance to be paid in accordance with such private arangements as I may make with the above bank.

It is further understood that if I fail to accept the stock on its arrival, one-half of the above deposit shall be forfeited. The balance of the deposit will be returned to me. Should the Association be unable to procure the kind and number of animals for which my application may be accepted, the proper proportion of my cash deposit will be returned to me promptly.

If I accept the stock I agree to take proper and intelligent care of it at all times.

I desire to purchase the following:

.....

.....

Name.....

Address.....

Placing Dairy Cows on Irrigated Farms (continued).

The bankers were very careful in selecting the farmers to whom cows were to be sold. The farmers gave notes drawing 10% interest, payable November 1, 1913. These terms are not as favorable to the farmers as are those of the Kuhn importations, but the farmers appear to be glad to accept the financial assistance even on the comparatively unfavorable terms.

The latest importation to Idaho reached the town of Gooding June 15, 1913. The shipment contained 128 head of cows and a few bulls. Most of the females are 2 and 3 year old heifers--grade Holsteins. They were purchased near Toledo, Ohio, and in the vicinity of Madison, Wisconsin, at an average cost of about $80 a head. To this cost was added an importation expense of $17 a head, making the average cost to the farmers about $97 a head.

Two methods were followed in the distribution of these cows. In one the farmers cast lots for the choice of cows, on which the prices were fixed before hand; in the other, the choice was left to a committee selected by the prospective buyers, this committee deciding which cows should go to each buyer. The cows were sold in numbers from 1 to 8.

The importation was financed by ex-Governor Gooding of Idaho, who accepted notes drawing 8% interest, payable in two years, with the proviso that at least $2 per cow should be paid each month.

It will be noted that the cost of the cows recently imported is much higher than the prices of 1912. This fact is due mainly to the greatly increasing demands from the far western states. So many buyers have visited the dairy sections of the Middle West that the stockmen there have become unusually appreciative of the value of their cows. The man who selected the cows in the Gooding importation stated that grade Jerseys could have been purchased more easily and at less cost than grade Holsteins, but the Gooding farmers are sharing the

Placing Dairy Cows on Irrigated Farms (continued).

country-wide "Black and White Craze", and insisted on grade Holsteins. This condition is apparently a part of the natural fluctuation of popularity of breeds.

In connection with any proposed importation, this matter should be closly studied. It may frequently happen that good cows of one breed can be bought for considerably less than equally good cows of another breed, and since the actual commercial differences between any two of the dairy breeds are comparatively unimportant in many cases, farmers could frequently save money by purchasing cows of a breed which for the time was plentiful. It was stated at Gooding that the cow market is $10 to $20 higher now than it was a year ago.

The progress being made by the farmers who have shared in these importations is generally very satisfactory. A visit to the irrigated sections where the dairy industry is being widely followed is most convincing of the adaptability of dairying to irrigated conditions. It seems certain that the dairy cow offers one of the very best solutions to the problem of profitably marketing the crop products of the irrigated lands. F. D. F.

VOUCHERS.

There has been sent out to each of the farms a supply of Form 5 vouchers. These are intended to take the place of Form A vouchers heretofore used for purchases and services other than personal. The Form A vouchers on hand should be discarded.

26 July, 1913.

FIELD NOTES.

Truckee-Carson.

During the week of July 12 almost the entire force of men was kept busy cleaning weeds from gardens, fields and ditches.

The wheat hay was cut on C-11 and 24 and E-1, 3, and 5.

There is so little water available for irrigation that the Reclamation Service has ruled that water will be delivered only for irrigation of sugar beets, new seedings of alfalfa, and gardens. There is not sufficient water to irrigate these crops. The water in Lake Tahoe is lower than it has been for many years, so that water cannot be obtained from that source. The situation is more serious than last year.

Yields of Alfalfa Varieties.

SPI No.	Name.	Series. A	Series. B	Series. A & B.
		(Pounds)		
1551	Caucasian	100	100	200
1158	M. ruthenica	...	...	...
1123	Arabia	35	30	65
1174	Peruvian	120	120	240
1175	Grimm	125	115	240
1176	Sand Lucerne	125	110	235
1177	Turkestan	135	95	230
1178	Montana	138	115	253
1179	Canadian	135	85	220
1180	Western-Grown	125	125	250
1181	Provence	100	90	190
1182	Elche	100	85	185

26 July, 1913.

FIELD NOTES.

Huntley.

During the week of July 12 alfalfa in Fields A and B was irrigated.

All grain plats and new alfalfa in Field K were irrigated.

Spring grain in Field M-I (Worden Tract)was irrigated.

The remainder of the time was spent in weeding, grading roads, and repairing ditches.

Umatilla.

The maximum temperature during the week ending July 12 was 97, minimum 48.

The second crop of hay was harvested and found to be heavier than the second crop of 1912.

Belle Fourche.

The maximum temperature during the week ending July 12 was 101, minimum 48.

All the sugar beets have been cultivated.

The corn in dry land rotations, variety corn in Field F series IV, and millet in Field E have also been cultivated.

Harvesting of winter wheat was commenced.

Corn and potatoes in the irrigated rotations were hoed.

All the alfalfa in Field A was irrigated, except the late seeded plats in time-of-seeding experiments.

Peas in the dry land rotations were plowed and disked.

All crops that have not been irrigated are suffering for want of moisture.

26 July, 1913.

FIELD NOTES.

Scottsbluff.

During all the week of July 12 the weather was hot and dry, with occasional warm winds that damaged some crops more or less.

The first cutting of alfalfa was put up Tuesday and irrigation was begun immediately. All the crops are needing water and all of the available men have been put to irrigating. So far, some of the alfalfa and potatoes have been gone over and the sugar beets almost finished. Although a little early, irrigation of the corn will have to be started, as it is beginning to fire.

San Antonio.

The maximum temperature for the week ending July 12 was 100, minimum 67; and greatest daily range 30.

Plats A4-5, 11, and 15, A5-3 and 6, and B4-17 were plowed. A plat of oat stubble on C5 was also plowed.

All of the cotton was gone over with hoes, and weeds and Johnson grass cut out.

A new corn binder was purchased and set up during the week. Cutting was started on Friday afternoon in the milo and the harvesting of milo no rotation plats was completed on Saturday morning.

The planted oats on plats A4-11 and 15 were threshed and yielded as follows:

A4-11	5 bushels per acre
A4-15	6.9 " " "

The oats were badly moulded from having been wet so many times.

Sudan grass for seed in 4-foot rows on C3 was threshed, and yielded at the rate of 897 lbs. per acre, or 21.4 bushels of 42 lbs. per bushel. The seed was not thoroughly dry, and the yield of dry seed will be slightly less.

26 July, 1913.

FIELD NOTES.

Yuma.

During the week of July 5, fig trees on borders C-8 to 17, inclusive, were summer pruned for the second time.

Cultivating, hoeing and thinning of Egyptian cotton experiments has been accomplished this week. Also, row plantings of alfalfa on C-42 to 45 were cultivated.

The leveling of farm road on the south is nearly completed and will soon be in condition to make plantings of date and Eucalyptus.

A considerable quantity of cotton seed, which has collected at the station for several years, is being ground to be applied to sandy lands as a fertilizer. A two horse-power gasoline engine and a small feed grinder are being used to crush the seed.

All the sugar beets grown in the valley have been pulled and shipped. On digging it was found that many beets were decayed, presumably because of the underground water which came very near the surface in many sections during high water crest of the river.

During the week of July 12, date plantings A-16 and 17 were disked.

Grain sorghum plantings on A-4, D-21 to 26, E-7 and 8 and cotton plantings on C-19 and 20, D-19 and E-9 were cultivated. Fig orchard C-8 to 17 and small nursery plots were hoed. Orchard plats B-25 to 30 and broom corn plantings on A-3 were cultivated.

Three men have been busy during the week hoeing weeds from ditches.

The newly leveled piece B-18 to 24 was irrigated and seeded to Whippoorwill Cow Peas. About a ton of ground cotton seed was applied to B-18 and disked in before planting to Cow Peas.

26 July, 1913.

FIELD NOTES.

Yuma (continued).

Stock counts of third grain sorghum plantings on B-24 and 25 were taken.

Alfalfa was harvested from lands B-9 to 12, C-6 and 7, D-6 to 16 and 27, with acre yields which are as follows:

CHILIAN.

Field.	Yield-lbs.	Tons per Acre.
B-9 and 10	2230	1.12
B-11 and 12	2135	1.07
C-6	630	.63
C-7	605	.61
D-6 and 7	1280	.64
D-8 and 9	1635	.82
D-10	810	.81
D-11	530	.53
D-12	470	.84
D-13	840	.84
D-14	1150	1.15
D-15	980	.98
D-16	1070	1.07
D-27	700	.70

Messrs. Cook and Doyle arrived at the station on Thursday after a two weeks trip through southern California.

PERSONAL.

Mr. Farrell left on the evening of the 23rd for a trip to the West, his departure having been delayed by matters requiring his attention in Washington.

26 July, 1913.

FIELD NOTES.

Scottsbluff.

During the first two days of the week of July 19 hot winds in the afternoon damaged the corn considerably and some of the small grain. On Thursday and Friday there was a total precipitation of 0.92 inch, which revived the dry land corn which was dying.

Irrigating beets on the irrigated rotations was finished and irrigating the wheat for the third time was begun.

The sugar beets on the irrigated rotations were cultivated for the last time.

Irrigating continued throughout the week and only another day's run was lacking to finish all irrigation when word was received that there was a break in the main canal and the water would be shut off for an indefinite time. This is the first break in the canal for more than two years.

Most of the winter wheat was cut Monday, and also one plat of barley. As soon as the ground gets dry enough some of the early oats will have to be cut, as well as most of the oats on the dry land.

Belle Fourche.

The maximum temperature during the week of July 19 was 96, minimum 54.

Harvesting of oats, barley, and winter wheat, and grain in variety test in the dry land rotations is nearly completed.

Thinning of sugar beets in the irrigated rotations is nearly done.

The corn, potatoes, flax, and wheat in Field A have been irrigated, and the potatoes in this field have been sprayed.

Alfalfa in fields O and P, and pasture experiment test in field K have been irrigated.

All crops on dry land are suffering for want of rain.

26 July, 1913.

FIELD NOTES.

Umatilla.

The maximum temperature during the week of July 19 was 100, minimum 44; greatest daily range 43.

Pipe has been secured and laid for running an irrigation experiment to determine the comparative amounts of water required to make a satisfactory irrigation by flooding from jointed pipe, by irrigating through shallow furrows and by sprinkling.

Mrs. S. H. Hastings, wife of Superintendent S. H. Hastings of the San Antonio Experiment Farm, died at her home in St. Johnsbury, Vt., July 21.

2 August, 1913.

PASTURING HOGS ON ALFALFA,
Rotation 65, Scottsbluff.

Rotation 65 consists of corn, flax, oats, and three years of alfalfa. According to the plan, the corn and the third year alfalfa are pastured off by hogs. The results obtained in 1912 (the first year of the rotation) were fairly satisfactory, but as the alfalfa plat on which the hogs were pastured was not planted until the spring of 1912, and as the hogs used were not of uniform age, the gains made were not as satisfactory as would be expected where the alfalfa was older and the hogs more uniform.

Deducting the value of the grain fed in addition to the pasture, the gains made in 1912 amounted to $19.82 an acre. The average yield of alfalfa on the 20 plats harvested in the rotation field in 1912 was 2.62 tons per acre. Assuming that this average represented the hay yield of the pasture plat, the hogs paid $7.56 a ton for alfalfa. To this should be added the cost of harvesting and also the value of the manure.

Under date of July 16, 1913, Mr. Holden reports the results obtained during two months from pasturing alfalfa in rotation 65, the plat pastured being second-year alfalfa. These results are surprisingly good. Mr. Holden says: "The returns almost frighten me, they are so large, but I will vouch for their correctness", and he states that the first and last weighings were duplicated, so as to insure absolute accuracy.

The results obtained by Mr. Holden are due largely to the careful attention to the details of selecting and caring for the hogs. Five thrifty young Duroc-Jersey barrows were used, and they were very well attended to throughout the experiment. The details of the test as furnished by Mr. Holden are given below:

"The hogs used in this experiment were Duroc-Jerseys. They were farrowed November 8, 1912.

Pasturing Hogs on Alfalfa (continued).

During the winter they were fed alfalfa hay and ground grain—a mixture of oats, wheat, and barley.

On May 2, when the alfalfa was 2 or 3 inches high, five barrows, weighing a total of 544 pounds, were turned into a 1/4-acre plat of alfalfa, which was seeded May 6, 1912. The plat was divided into two equal parts and the hogs changed from one to the other as they fed it down.

In addition to the alfalfa pasture, the hogs were fed 2 pounds of corn per 100 pounds of live weight per day. During the experiment the hogs were fed 18.7 bushels of corn. The corn was always fed in the evening.

These five barrows were kept on this 1/4-acre plat until July 2. This made 60 days that they were on pasture. At the end of this time they weighed a total of 925 pounds, having gained 381 pounds. The weighings at the beginning and end of the experiment were duplicated.

The local price of hogs at present is $7.50 per 100 pounds. The Omaha prices are quoted as ranging between $8.60 and $8.85 per cwt. The gain from the 18.7 bushels of corn and the 1/4 acre of alfalfa pasture at the local price of hogs would, therefore, be worth $28.58. Subtract from this the value of the corn, which is 60¢ a bushel, or $11.22 for all the corn fed, and we have $17.36, which may be considered the return from the 1/4 acre of alfalfa pasture. One acre would, then, return $69.44.

The same day that the hogs were removed from the pasture plat, 11 similar plats were cut for hay, which yielded on an average 1.84 tons per acre. Hay is selling at $6.00 per ton delivered at Mitchell.

By disregarding the value of the manure left on the land after pasturing alfalfa and assuming that the cost of cutting, bunching, and hauling the hay to market is the same as caring for the hogs, the gains made are equivalent to a return of $69.44 per acre, as against $11.04 when the alfalfa is sold as hay.

2 August, 1913.

Pasturing Hogs on Alfalfa (continued).

Summary.

Total weight of hogs on May 2.....	544 lbs.
Average weight per hog on May 2.....	109 "
Total weight of hogs on July 2.....	925 "
Average weight per hog on July 2.....	185 "
Gain made from 18.7 bushels of corn and 1/4 acre pasture.....	381 "
Average gain per day per hog.....	1.27 "
Local market value of gain, 381 lbs. @ $7.50 per cwt.....	$ 28.58
Local market value of corn fed, 18.7 bu. @ 60¢.....	$ 11.22
Value of gain made on 1/4 acre after deducting cost of corn fed.....	$ 17.36
Value of 1 acre of alfalfa pasture up to first cutting.....	$ 69.44

- - - - - - - - - - - - - - - - - -

The results reported above point to a method of utilizing alfalfa which a large number of farmers on the irrigated lands could doubtless follow with a great deal of profit. It seems likely that success depends principally on the character of hogs used and on the skill with which they are handled. It is not likely that satisfactory results could be obtained unless some grain were fed in addition to the alfalfa pasture; and regularity in feeding and watering is essential.

On July 2 the hogs were taken off the pasture and their place was taken by some spring pigs which will be used during the remainder of the season on the alfalfa and in hogging off the corn in the same rotation.

The results obtained in the same rotation at the Huntley and Belle Fourche farms will be reported in a later Bulletin.

F. D. F.

2 August, 1913.

PLACING SHEEP ON IRRIGATED LANDS.

An experiment which will be followed with some interest is being tried on the Minidoka Project and the Idaho Irrigation Company's projects in Idaho. It is an attempt to run small bands of sheep on the irrigated farms.

The venture is being financed by one of Idaho's leading sheepmen. This man sells purebred ewes, 4 or more years old, at $10 a head and accepts the farmers' notes, payable in 4 years and drawing 6 per cent interest. In payment of principal and interest he takes all the male offspring of the ewes. The ram lambs are delivered October 1 of each year, $8.00 a head being allowed for 95 per cent of these lambs and $3.00 a head for the remaining 5 per cent. In cases where the number of male offspring is not sufficiently large to pay the notes in 4 years more time is allowed.

The sheepman's interest in the proposition is that he gets a supply of good rams for breeding purposes and also finds a good market for some of his mature ewes. The plan enables the farmers to engage in the sheep business on a small scale without having to borrow money at a high rate of interest. Each year the farmers can sell wool and ewe lambs while the ram lambs are paying off the original indebtedness.

The first sales to farmers were made in the fall of 1912, so that it is yet too soon to determine how successful the business will be. Two farmers interviewed on the Minidoka Project are securing fairly promising results. One of these bought 30 head of ewes last fall and these lambed 125 per cent this spring. About half of the lambs are rams. The ewes sheared 12 pounds of wool each this spring. It is interesting to note that this farmer is pasturing 76 head of sheep on 7 acres of mixed grass pasture.

Another farmer bought 100 head of ewes, which lambed 100 per cent. This is rather a low percentage and could doubtless have been increased if better care had been given the sheep. This farmer has

2 August, 1913.

Placing Sheep on Irrigated Lands (continued).

46 ram lambs, which will bring about $350 October 1. The band of about 200 head of ewes and lambs is being pastured on about 15 to 20 acres of land which has become waterlogged and produces only salt- and water-tolerant grasses. The land is not fit for the production of ordinary farm crops.

As there is a possibility that sheep can be profitably utilized on many of the irrigated farms, it might be well for the field men to keep this matter in mind and look into the possibility of trying such a plan as is outlined above.

F.D.F.

CORN FOLLOWING BEETS AT SCOTTSBLUFF.

In a letter dated July 16, Mr. Holden says:

"You will remember that the corn following beets on Rotation 65 was very small and sickly-looking and that we were undecided what the cause might be.

There is but little doubt in my mind now that this condition is due to the fact that the corn follows beets. Last year, you will no doubt remember, I had a narrow plat of land just east of K-V-1 to 4 seeded to eight rows of beets, six rows of potatoes, and six rows of corn. This plat was irrigated last fall and this spring it was plowed and all seeded to corn. There is a very noticeable difference in the corn on this plat. That in the rows where the beets were is very small and has a yellow color; that following potatoes is very much larger; but that following corn is still better."

2 August, 1913.

PUBLICATIONS,
New Plan of Issue.

Departmental Memorandum No. 34, dated July 1, 1913, outlines a plan for issuing publications of the Department of Agriculture after July 1, 1913, about as follows:

A "JOURNAL OF RESEARCH" is to be established, in which will be published only reports of investigations which are new and directly or indirectly useful to the Art of Agriculture. Articles for publication in the Journal must be concise—in general not over 10 or 12 pages in length and in no case more than 50 pages. Articles of greater length than this will be published as supplementary monographs.

Both the Journal and the monographic supplements will be royal octavo ($6\frac{1}{2}$ x 10 inches) in size, in order to give greater freedom in the use of diagrams and technical illustrations. Separates of the different articles will be printed and made available for distribution at the time of the issue of the number of the Journal containing the articles. Practically the same regulations regarding the distribution of separates from the Journal will be followed that are now in force regarding the distribution of technical bulletins.

The entire Journal will be distributed free only to agricultural colleges, technical schools and experiment stations, to the libraries of the large universities, to the Government depositories, and to such institutions as make suitable exchanges with the Department.

The selection of articles for publication in the Journal and all other matters pertaining to its management will be delegated to an Editorial Committee, of which Dr. Karl F. Kellerman, of the Bureau of Plant Industry, is named as Chairman.

For the present the contributors will be confined to members of the official scientific staff of the Department, but it is proposed later to include the scientific workers of the State agricultural experiment stations.

2 August, 1913.

Publications (continued).

The Bureau series of bulletins and circulars will be discontinued and the scientific material heretofore published as bulletins of the various bureaus will hereafter be published in the Journal of Research or as monographic supplements. Popular matter heretofore published in the bulletins of the bureaus and also that printed as circulars will hereafter be published in a Department series of bulletins which will be popular discussions of the investigations of the Department. All encyclopedic material will be omitted. The term "circular" will be discarded for the more appropriate designation "bulletin".

The Farmers' Bulletin series will be continued. These will be practical, concise, specific and instructional statements on matters relating to country life and will seldom exceed 16 pages. They will be written in such literary form that they will be read.

The Yearbook series will be continued and papers therein will be of a magazine character, rather than technical discussions or reports of progress.

The Foreign Crop Reports and the Crop Reporter will be discontinued.

AUTOMOBILE AND MOTORCYCLE LICENSES.

In an opinion dated July 22, the Comptroller of the Treasury decides that payments of fees required by the States for licenses for the operation of automobiles and motorcycles belonging to the United States Government are not proper charges against the appropriation for the Department of Agriculture.

Accordingly reimbursement for such expenditures will not be made.

2 August, 1913.

FIELD NOTES.

Umatilla.

During the week ending July 26 the maximum temperature was 105, minimum 60; greatest daily range 40.

The warm weather and winds of high velocity have done considerable damage to crops, such as cantaloupes, corn, etc., during the week.

Truckee-Carson.

The maximum temperature during the week ending July 19 was 94, minimum 42.

The wheat on C-11 to 24, E-1, 3, and 5 was cut for hay. A total yield of 1,390 pounds was obtained from an area of approximately 4.5 acres.

A second thinning was given the onion varieties on field S.

The tree plats on fields A and C were cultivated and weeds were cut along all ditch banks.

Belle Fourche.

The maximum temperature during the week ending July 26 was 95, minimum 47; precipitation, 0.09 in.

Thinning of sugar beets in the irrigated rotations was completed and plats were furrowed preparatory to irrigation.

Alfalfa and flax in field K and all alfalfa in irrigated rotations were irrigated.

Pine nursery and forest were irrigated the latter part of the week.

Oats on the dry land in fields O and P were cut and stacked for feed, because on account of the drouth there was not enough grain to thresh.

Winter wheat in A, series I, plat 48; series II, plats 2, 3, 4, 5, 6, and 28 has been cultivated.

Late seeded alfalfa plats in irrigated rotations were weeded.

Harvesting of spring wheats in dry land rotations was commenced.

Alfalfa nursery in field G was harvested and hauled in for feed because of light production of seed on account of drouth.

2 August, 1913.

FIELD NOTES.

San Antonio.

The maximum temperature during the week ending July 19 was 97, minimum 66, greatest daily range 30. There has been no rain for more than two weeks.

Harvesting of milo and other grain sorghums was completed the first part of the week.

Sorghum for forage was also cut and raked.

Threshing of milo was started on Friday, but as the threshing was not completed yields will not be reported until next week.

Orchards and fallow were cultivated.

Weeds and Johnson grass on waste land were cut and raked.

Plowing on field C-5 was continued.

Cotton on the farm is being damaged by the Mexican cotton boll weevil. Weevils are so numerous that practically all new squares are dropping off. Indications are that the yields will be much smaller than was expected some time ago.

The maximum temperature during the week ending July 26 was 102, minimum 67; greatest daily range 31; total precipitation 0.02 in.

The first three days of the week were consumed in threshing grain sorghums. On examination of the milo plats in the rotation experiments, it was found that it will be necessary to go over the plats again and collect what loose heads remain on the ground. Therefore, the yields will not be reported until this work is completed.

The orchard on E-3 was cultivated.

The nursery was weeded and partly irrigated and the grounds were irrigated.

About 1/4 acre of Dwarf milo was planted on D3 and was irrigated the following morning, the soil being too dry to germinate the seed.

Sorghum for forage on D4, B3, and A4-9 was cut.

The second cutting of Sudan grass on plat B-4 was made on Friday.

2 August, 1913.

FIELD NOTES.

Huntley.

During the week of July 19 the winter wheat on the Worden Tract and in field K was harvested.

Spring grain plats in M-i, sugar beets in K, and oats in C were irrigated.

The remainder of the time was spent in weeding, repairing ditches, and hauling gravel.

During the week of July 26 alfalfa in fields A and B was irrigated.

Potatoes and corn in field K were irrigated.

Alfalfa in Field K was harvested.

Messrs. Cole and Burr visited the station on the 21st, and Mr. Aune on the 25th.

Scottsbluff.

Throughout the week of July 26 the weather was considerably cooler than during the previous week. On Wednesday and Thursday there were good showers, there being a total precipitation of .31 inch.

All of the potatoes and sugar beets have been gone over with the hoe for the last time. Both of these crops are making very rapid growth. All of the late seeded beets, or what might be called reseeded beets, are growing very slowly. This is no doubt due to the hot winds. The Factory has great fear that on account of the lat seeded beets the opening may be delayed several weeks.

Practically all of the dry land grain has been cut, and all but two varieties of the irrigated barley was cut during the week.

On Thursday water was again turned into the ditch and irrigation was finished.

It is hoped that the second cutting of alfalfa may be begun within a few days if the weather gets settled.

On July 22 the Second Annual Farmers' Picnic at the Experiment Station was held. Several hundred farmers attended and all of them took a great interest in the work of the station. Since these picnics were organized there has been a much better understanding between the farmers and the station.

2 August, 1913.

FIELD NOTES.

Scottsbluff (continued).

Following are the yields of alfalfa from Field K:

Series.	Plat.	Yield. tons per acre.
I	9	2.084
II	9	1.746
II	10	1.914
III	9	1.464
III	10	1.738
IV	9	1,822
IV	10	1.692
II	14	1.802
III	14	1.960
IV	14	2.022
V	14	1.902
V	1	1.980

Maximum..... 2.084
Mean..... 1.844
Minimum..... 1.464

(All of the above were on 1912 spring-seeded plats).

Series.	Plat.	Yield. tons per acre.
I	8	1.596
IV	13	.702
V	13	.622

(Above were fall-seeded into stubble).

2 August, 1913.

FIELD NOTES.

Scottsbluff (continued).

Alfalfa Irrigation Experiments on Field K, Series V.

Plat.	Yield. tons per acre.	Treatment.
2	1.940	Irrigated late fall 1912 and early spring 1913.
3	2.140	" early " " " " " "
4	2.118	" " " " " late " "
5	1.740	No irrigation since fall of 1912.
6	2.052	Irrigated late fall 1912 and late spring 1913.
7	2.082	Three irrigations spring of 1913.
8	2.030	Four irrigations spring of 1913.
9	1.892	Usual irrigation.
10	2.700	Cut July 12.) Usual irrigation.
11	1.220	Cut June 23.)

All alfalfas except where stated were cut July 2.

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PERSONAL.

Mr. Scofield has completed his work in connection with the Morganthau expedition and resumed his regular duties in the office August 1.

Messrs. Hastings and Blair are at the Washington office.

9 August, 1913.

PASTURES ON IRRIGATED LAND.

In connection with the introduction of dairy cows and sheep on the irrigated lands, a good deal of interest is manifested in the question of pastures. For this reason the writer has recently given some attention to methods of getting pastures started, the grasses and legumes used and the carrying capacity of the irrigated pasture lands; and tests of several pasture grasses and grass mixtures have been started at the Scottsbluff, Huntley, and Belle Fourche Farms.

In the Bulletin of July 19 it was stated that three methods of summer feeding of dairy cows are being successfully followed in south Idaho, these methods being: (1) Feeding green alfalfa, (2) feeding alfalfa hay, and (3) pasturing. Each of these methods has its advantages and disadvantages, so that the choice of method is largely a matter of individual preference. Pasturing is generally favored by those whose chief aim is to economize on labor, and it is a very satisfactory method where conditions and land treatment are such as to favor the getting of a good pasture.

1. The Gooding Pastures.

At the Experiment Farm at Gooding, Idaho, two plats are devoted to pasture tests, both cows and sheep being used to determine carrying capacity. Plat 1a (1/2 acre) was planted May 4, 1912, to the following, the rates of seeding being on an acre basis:

Bromus inermis.....	7 lbs.
Italian rye grass...	7 "
Meadow fescue.....	8 "
Red clover.....	3 "

All the grasses planted at Gooding were broadcasted and harrowed in very shallowly. All the grasses planted on plat 1a have resulted in an excellent growth, but the red clover is perhaps somewhat too thick for best results. The plat is divided into three parts of 1/6 acre each and 13 head of sheep are being pastured. With this number of sheep the grass and clover have made so much growth

Pastures on irrigated land (continued).

that they will have to be cut at least twice this year. It seems certain that twice as many sheep could be pastured with better results, since they would prevent the crop from growing too tall and rank, as it was at the time of the visit, June 16. The present rate of pasturing is 26 sheep per acre.

Plat 2 (1 acre) was planted May 11, 1911, to the following, at the rates in pounds per acre indicated in parentheses: Kentucky blue grass (8), Bromus inermis (4), Meadow fescue (4), Italia rye grass (4), orchard grass (4), timothy (2), red top (2), white clover (2). These made good growth in 1911 and were lightly pastured in the fall of that year.

In 1912 the plat was fenced off into six subdivisions. A cow was pastured on three subdivisions and 7 mature rams were pastured on the other three. From May 6 to September the cow was on the three pastures (1/2 acre) a total of 112 days. On the other three pastures (1/2 acre) the 7 rams were pastured the same length of time. Feed was abundant throughout the season. It will be noted that the pasturing was at the rate of 2 cows per acre in one case and 14 mature sheep per acre in the other. The acre plat was irrigated ten times in 1912, the total water applied being 2.57 acre-feet.

In the spring of 1913 plat 2 was divided into three pastures, and these have been supporting 2 milk cows since May 1. At the time of the visit, June 16, one pasture had just been mowed and the hay was in the cock. It looked as if the yield would be about 1500 pounds per acre. The other two subdivisions had a growth of grass and clover about 18 inches to 2 feet high—too rank for the best pasture value. There can be little doubt that the three subdivisions (total are 1 acre) would easily support 4 cows instead of two.

If there is any fault to be found with this pasture, it is that there is too much white clover; but no bloating difficulty has been met so far. All the grasses planted are well represented, but orchard grass seems to be in the lead. The method

Pastures on irrigated land (continued).

of subdividing used on this pasture is an excellent one. The cows are changed from one inclosure to another each week. In this way one pasture is irrigated while one is allowed to grow and the third is being pastured off; and the cows are on each pasture one week in three. It has never been necessary to change the cows in order to allow the feed to grow, since the growth has always been more than sufficient, but the changing has doubtless allowed the grass to "freshen up" so that its palatability has been increased.

The Gooding pastures are planted on land which was formerly in alfalfa, but which was planted to corn, potatoes, and garden crops in 1909 and 1910. Very great care was taken in preparing the soil for planting the pasture grass seed. The land was harrowed and smoothed until it was fit for garden crops or a lawn. This extra good preparation is a point of great importance and should be kept in mind in connection with getting pastures established.

2. The McWaters Pasture. At Jerome, Idaho, Mr. D. C. McWaters has an excellent pasture of 80 acres, divided into 6 fields. Here are pastured cows, sheep, and horses. The actual number of stock carried is about 15 sheep per acres in one case and 2 cows in the other. The horses, only 6 or 7 head, are pastured with the cows. In the case of the cow pastures it appeared that at least one more cow could easily be carried, as the growth was more than a foot high over almost the entire area.

This pasture was planted in the spring of 1911, on recommendations from the Gooding Experiment Farm, and the grasses and methods used were substantially the same as those used at Gooding, except that the planting was done on land that had produced only one or two grain and potato crops since it was broken up.

3. The Harvesty Pasture. This pasture was referred to in Bulletin of July 19, in the discussion of dairy farming, paragraph 5. It is a 10-acre pasture and contains only orchard grass, meadow

Pastures on irrigated land (continued).

fescue, Italian rye grass, and Bromus inermis. The owner is afraid to use any legume on account of the possibility of bloating. He pastures 21 cows on the 10-acre field, which is not subdivided, and supplements the pasturage by feeding cured alfalfa hay at night. This pasture is slightly over-grazed, but its carrying capacity could doubtless be increased if the field were subdivided and some white clover included.

4. The Rupert Pastures. Several successful pastures were visited in the vicinity of Rupert, on the Minidoka Project. The most notable thing about these pastures is the great predominance of white clover. This legume grows and persists almost like a weed on the Minidoka Project. In some of the pastures visited it occupies probably 75 to 90 per cent of the land. The most common pasture grasses found are timothy, orchard grass, Kentucky blue grass, and Bromus inermis. The latter is particularly well liked, because of its early spring and late fall growth.

In connection with pasturing white clover it is of interest to note that the danger of bloating seems to be greatest when the weather is cold and moist or when the clover is comparatively short. On one farm, that of Mr. B. F. Spittler, at Rupert, two cows and a yearling heifer were slightly bloated at the time of the visit. The owner appeared not to take the bloating seriously. He said his experience had led him to believe that where the stock is kept continuously in the field the bloating that occurs is practically never fatal. His pasture was fairly closely grazed, the growth being only about 6 inches high. At Gooding and Jerome, where pastures are not grazed to anywhere near their capacity, and where consequently the clover grows rank, there has been no difficulty whatever with bloating.

Another farmer near Rupert milks 17 cows which are pastured on about 10 acres of mixed grasses, with a little white clover "volunteering". This farmer also feeds alfalfa hay at night and a small quantity of bran at milking time. It was found that the practice of supplementing pasturage

Pastures on irrigated land (continued).

with light alfalfa hay feeding is rather common in south Idaho. This seems to be desirable, particularly where the pastures contain few or no leguminous plants.

A statement appeared in the Bulletin of August 2, in the article on sheep, relative to sheep pasturage on a farm near Rupert. On this farm is a 7-acre pasture of mixed grasses and some white clover, on which 76 head of sheep were grazing. The feed appeared to be more than sufficient. It seems certain that at least 15 head per acre could readily be supported. There are now 11 head per acre.

It is interesting to note that on the Minidoka Project it takes a year longer to get a pasture established than it does on the Twin Falls Tracts and at Gooding. At the latter places it is commonly practicable to pasture the land to some extent during the late summer following the spring planting. On the Minidoka Project it was stated that it required about a year's time before the land could properly be pastured at all, and that continuous pasturing was frequently inadvisable until the pasture was two years old.

At the Scottsbluff Experiment Farm Mr. Knorr is pasturing the mess cow on the lawn about the buildings, where a number of grasses and considerable white clover are growing. The grounds were planted in 1912 and the growth this year has been fairly good. The pasturing of the cow is not on an experimental basis, so it is not possible to state any very definite figures; but up to June 28 the cow had not succeeded in making much of an impression on the growth of the small area where she had fed. It would certainly be conservative to say that an acre of such pasture would easily support two cows during the pasture season.

After visiting a large number of pastures in Idaho, the writer has no doubt that we have been somewhat inclined to underestimate the possibilities of pasturing on the irrigated lands. If the necessary care is taken in land treatment and the pastures

9 August, 1913.

Pastures on irrigated land (continued)

are properly cared for after they are started, each acre will support from 2 to 4 cows throughout the pasturing season. Taking the lower figure, a farmer with 10 acres of good pasture can keep 20 milk cows, which are about as many as one man is able to care for.

Some of the more important points to be kept in mind in connection with pastures are the following:

1. The land should be prepared with very great care—practically as well as if a lawn were to be planted.
2. A reasonably large number of grasses and at least one legume should be planted, in order to furnish the desired variety in the feed and to insure a good stand.
3. White clover should usually be planted at a very low rate (1 to 2 pounds per acre) to prevent it from becoming too prominent.
4. The pasture should be divided into two, or, preferably, three parts. This facilitates irrigation, increases plant growth, and provides a better supply of fresh feed for the stock.
5. Pasturing may frequently be supplemented by alfalfa feeding with good results.

The pasture tests started last spring at the Huntley, Scottsbluff, and Belle Fourche Farms have not gone far enough yet to furnish much information. At Scottsbluff the best showing so far made in the separate grass plats has been by the Italian rye grass, Bromus inermis, meadow fescue, and perennial rye grass. It is yet too early to get an accurate estimate of the conditions in the mixture plats, but the stands are fair and the prospects for obtaining satisfactory pastures are good. Mr. Aune reports that the best showing is being made at the Belle Fourche Farm by red top, Italian rye grass, tall fescue, western wheat grass, and Bromus inermis. At Huntley, according to a recent report by Mr. Hansen, pasture mixtures A and B were planted on very heavy soil and failed to make a stand. Mixture C, which contained alfalfa, clover, and twelve

Pastures on irrigated land (continued).

grasses, gave, on July 8, the following stand, in thousand plants per acre: Alfalfa, 239; clover, 106; and grasses, 361. All of the 12 grasses planted separately have made a fair stand except timothy, Kentucky blue grass, red top, western wheat grass, and orchard grass.

F. D. F.

WEEKLY NEWS LETTER TO CROP CORRESPONDENTS, To Be Issued by the Department.

Departmental Memorandum No. 37 states that a Weekly News Letter to Crop Correspondents will be issued, beginning the first week in August, as a partial substitute for the monthly Crop Reporter, notice of discontinuance of which was given in Memorandum No. 34 (Weekly Bulletin of August 2).

This letter will consist of two or more pages (8 x 13 inches) of elite type, duplicated on the flexotype machine. The purpose of the News Letter will be to supply a quick and effective means of communication to producers and an effective means of securing the cooperation of the press in county seats and small towns. The body of the letter will be mailed to all correspondents in the United States, and in addition there will be issued a localized supplement containing items affecting limited localities, to which it will be mailed.

PERSONAL.

Messrs. Hastings and Blair left Washington on the 6th for their respective stations. While en route they will visit the State Stations at Madison, St. Paul, Ames, Lincoln, Manhattan, Hays, and Garden City, and Mr. Hastings will also stop off at Amarillo, Texas, to visit the station at that point.

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FIELD NOTES.

Umatilla.

During the week ending August 2 the maximum temperature was 103, minimum 46; greatest daily range, 45.

The weather continued hot and the growth of most crops was at a standstill. A hot, drying wind from the northeast had done considerable injury.

The soil moisture work of testing sprinklers vs. jointed surface pipe vs. the furrow system was begun.

Mr. Allen spent Saturday at Stanfield, doing some cooperative work.

The first watermelons and cantaloupes of the season are ripening.

Yuma.

During the week of July 26 the fifth and last successive planting of seven grain sorghum varieties was seeded to C-37 and 38.

Selection 157 and Laguna corn were planted on D-35 and 37.

The first cutting of seed alfalfa was made on C-39. On account of the variation in soil, causing seed to ripen unevenly, some fields will have to be harvested in sections.

Fields A-15-1 and 2, B-9 and 10, and C-7 to 11 were sown to Whippoorwill cowpeas.

The work of leveling the road on the west side of the farm was containued; also hoeing ditches, nursery plats, date nursery, and B-25 to 30, orchard.

All sorghum, cotton, broomcorn, pomegranates, and date plats irrigated early in the week were cultivated.

Sudan grass and Tunis grass on D-41 and 42 was harvested.

Broomcorn planting on A-3 is heading irregulaly. Some heads are ready to cut while others are still forming.

Mr. Gilbert reports cotton work as follows: All thinning experiments have been completed except that which is to be thinned gradually, which is to

9 August, 1913.

FIELD NOTES.

Yuma (continued).

have one more thinning. The cool nights of the past week have retarded the growth of the plants and the flowering to some extent.

The cotton grown by the settlers is still looking good, except the low lands.

Mr. C. G. Church finished his cantaloupe work and left on the 3rd for Indiana.

Prof. Freeman of the Tucson University and Mr. Woods, of the Yuma Valley Station, visited the Farm on Sunday.

Mr. Gilbert returned from Sacaton and the Salt River Valley Saturday.

Truckee-Carson.

During the week of July 26 the maximum temperature was 90, minimum 52.

On the 22nd and 23rd heavy rains occurred on the watershed draining into the Truckee River, so that for a few days more water came down the river than could be carried by the canals. These rains came just in time to prevent heavy loss of crops, for the alfalfa, potatoes, sugar beets, and garden crops were beginning to suffer from lack of irrigation.

Mr. Headley on Tuesday drove to the Indian School and to Stillwater to inspect crops grown in cooperation with the Experiment Farm. The grain variety tests at the Indian School are highly satisfactory. The barley was ready to cut and some of the wheat and oat varieties are beginning to mature. The basket willow varieties are growing well, but the plat is rather weedy. The sugar beet and grain crops about Stillwater are unusually good.

On Thursday Mr. Headley went to Reno to confer with the Experiment Station authorities. The office of Irrigation Investigations is conducting an experiment in irrigation with large cylinders about 5 feet long and 2 feet in diameter. Arrangements

9 August, 1913.

FIELD NOTES.

Truckee-Carson (continued).

have been made to secure the specifications for these cylinders, as it is thought they would be suitable for certain experiments being conducted on the Truckee-Carson Farm.

Comparative Weather Records for July.

Maximum temperature.....	99.0
Minimum temperature.....	42.0
Mean temperature.....	70.0
Rainfall.....inches	1.53
Wind velocity....miles per hour	3.33
Days clear.....	14
Day cloudy.....	14
Days partly cloudy.....	7 (?)

Scottsbluff.

The weather during the week of August 2 was excellent for harvesting. Heavier dews have fallen than have ever been noticed in the past.

All of the second crop of alfalfa has been cut with the exception of Field K.

Nearly all of the small grain has been cut and is in good shape. Very little grain lodged this year and for that reason cutting progressed rapidly.

Threshing of the dry land grains and some of the earlier cut irrigated grain was commenced. The threshing of the dry land oats was completed. The maximum yield was 52 bushels and the minimum 9.7 bushels per acre. The winter wheat yields were 24.2 maximum and 6.3 minimum.

Considerable discontent has been shown among some of the farmers on accout of lack of water. After the break in the canal was fixed the Reclamation Service rotated the water, two days on and four days off, in order to get around to every

9 August, 1913.

FIELD NOTES.

Scottsbluff (continued).

irrigator as rapidly as possible and permit the farmers to water those spots that needed water the most. Not understanding the situation nor realizing the difficulty under which the Service ran the water through the canal due to the break, several farmers' meetings were held and resolutions were drawn up for presentation to the Secretary of the Interior, complaining about the irrigation water.

Since the farmers' picnic there have been a great many visitors at the station. Many of the farmers attending the picnic were not able to ask all the questions they wanted to or see the particular work they were interested in, and consequently many of them are coming now to get fuller information.

The growing of barley and oats seems to be of special interest to the people here and the information desired is largely along these lines. Corn is also becoming one of the large crops here. The farmers will eventually grow these three grains to the exclusion of all other crops except alfalfa, which they will always need in the rotations.

San Antonio.

The maximum temperature for the week ending August 2 was 101, minimum 68; greatest daily range 29. The total precipitation was 0.36 inch, which came as a shoer on Friday evening.

Plowing of oat stubble on C-5 was completed.

Irrigation of the nursery was completed, after which it was cultivated.

Japanese sugar cane, Teosinte, tomatoes, etc. on D-3 were irrigated on Monday.

Palms, trees, shrubs, etc., on the grounds were irrigated.

The sorghum cut down last week was raked and cocked.

9 August, 1913.

FIELD NOTES.

San Antonio (continued).

Plat A-6-18 was manured preparatory to plowing.

Johnson grass on D-5 and C-6 was cut and raked.

The milo planted and irrigated last week on D3 came up to a good stand.

Milo plats in the rotation fields were gone over and all heads remaining were collected and threshed.

The following table shows the yield of the milo from the different rotation plats for 1913.

Plat.	Yield per Plat		Yield per acre.			% of Grain	% of Injury
	Straw and Grain	Grain.	Straw and Grain	Grain.			
	Pounds	Pounds	Pounds	Pounds	Bushels		
A4-12	1838	688.5	7312	2754	49.2	37.6	0
A4-16	1612	620.0	6448	2480	44.3	38.5	0
A5- 2	1656	683.0	6624	2732	48.8	41.3	2 to 3
A5- 5	1672	708.0	6688	2832	50.6	42.4	2 to 3
A5- 9	1688	656.5	6752	2626	46.9	38.9	3 to 4
A5-13	1650	695.5	6600	2782	49.8	42.2	3 to 5
A5-17	1710	739.0	6840	2956	52.8	43.2	1 to 2
A6- 1	1306	507.0	5224	2028	36.2	38.9	2 to 3
A6- 2	1434	668.5	5736	2666	47.6	46.6	4 to 6
A6- 6	1612	587.5	6448	2350	42.0	36.5	1 to 2
A6-14	1626	583.5	6504	2334	41.7	35.6	4 to 5
B4-18	1992	758.0	7968	3032	54.1	38.0	0
B4-19	2098	801.5	8392	3206	57.3	38.2	0
B5-18	1592	646.0	6368	2584	46.1	40.6	0
Average			6707.4		47.7		

The bird injury shown in the last column was estimated on the basis of the entire plat. While the percentages may not be exactly accurate, it is believed that they show the relative amount of injury to the various plats.

Mr. Letteer made a trip to College Station the first part of the week to attend the Texas Farmers' Congress and visit the State Experiment Station.

16 August, 1913.

FIELD NOTES.

Yuma.

During the week of August 2 Field A-10-8 was sown to Whippoorwill cowpeas.

The first cutting of the 7 grain sorghum varieties (Brown Kaoliang) was harvested on D-21 and 23. - Practically all the seed was destroyed by birds.

Seed alfalfa fields B-31 and 32, C-37 and 38, 40, 44, and 45 were harvested.

Alfalfa for hay was cut on A-6 to 9 and 10-7.

Broomcorn on A-3 was harvested. As all the heads were not sufficiently advanced, a later cutting will have to be made.

The following fields were renovated: B-31 and 32, and C-27.

The fig, date, and deciduous orchards were furrowed for irrigating.

The nursery and other small plats were cultivated and hoed. Also the work was continued of hoeing roads, borders, and ditches.

A new domestic supply well was driven.

Truckee-Carson.

During the week of August 2 the maximum temperature was 94, minimum 52.

The second crop of hay was cut on Fields N8, N9, and on Z.

The work of leveling a hill south of the forestry, field C, was begun. The earth from the hill will be used to raise the level of the west end of field C, which is at present too low to produce crops.

Belle Fourche.

The maximum temperature during the week of August 2 was 101, minimum 42; precipitation 0.18 in.

Alfalfa, oats, and grain varieties in the irrigated rotations were harvested the fore part of the week.

16 August, 1913.

FIELD NOTES.

Belle Fourche (continued).

Potatoes, corn, beets, and alfalfa in Field A were irrigated, and alfalfa in Fields O and P, and the garden and grounds were irrigated.

Harvesting of grains in the dry land rotations was completed.

Oats in Fields I and K were harvested.

Threshing was commenced on Friday.

Mr. Farrell arrived at the station Saturday.

Scottsbluff.

During the week of August 9 the second cutting of alfalfa hay was put up. On account of the cool weather the hay dried very slowly. The second cutting was only a little heavier than the first cutting. On account of the late season a heavy third cutting is not expected.

All of the dry land grains were threshed during the week, as well as the barley varieties and the winter wheats of the irrigated land.

Barley Yields.

Variety.	Straw. Pounds.	Grain. Bushels.
*Bald G. I. 262.....	4,500	33.5
*Unknown.....	2,520	42.0
*Bald G. I. 12709....	2,350	39.1
Mariant.....	4,900	53.7
No. 90.....	6,500	64.7
Hooded.....	4,700	28.9
No. 531.....	6,400	60.8
Barbary 26179.....	4,400	47.5
S. P. I. 30393.....	6,800	65.8
Franconian 680.....	7,400	69.5
Scotch Four Row.....	5,380	71.2
Thomas.....	5,580	60.2
Cali. Feed.....	5,900	56.5

* Hull-less varieties.

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FIELD NOTES.

Scottsbluff (continued).

The calculations for the winter wheats have not been made and will be given next week.

On Tuesday irrigation was again started on all of the rowed crops, and a portion of the alfalfa was also irrigated.

It has been found necessary to bore a new well on the farm. A depth of 76 feet has been reached without striking any water.

Mr. Farrell arrived at the station August 8.

Huntley.

During the week of August 2 alfalfa from A-IV and K was hauled in. The yields are as follows:

Yield of Alfalfa on Field A-IV.

Plat.		Date Harvested.	Pounds per plat.	Tons per acre.
A-IV-1	(N.C.)	7-28-13	705	1.41
A-IV-2	(Early)	do	630	1.26
A-IV-3	(Late)	do	580	1.16
A-IV-4	(18" rows)	do	625	1.25
A-IV-5	(N.C.)	do	700	1.40
A-IV-6	(Early)	do	685	1.37
A-IV-7	(Late)	do	815	1.63
A-IV-8	(18" rows)	do	840	1.68
A-IV-9	(N. C.)	do	955	1.91
A-IV-10	(Early)	do	885	1.77
A-IV-11	(Late)	do	885	1.77
A-IV-12	(18" rows)	do	915	1.83
A-IV-13	(N.C.)	do	1105	2.21

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FIELD NOTES.

Huntley (continued).

Yield of Alfalfa on Field K.
(Second crop).

Rotation number.	Plat number.	Date harvested.	Pounds per plat.	Tons per acre.
67 D	KII-1	7-23-13	885	1.77
67 E	KII-2	7-23-13	885	1.77
67 C	KII-6	7-24-13	490	.98
61 D	KIII-1	7-23-13	905	1.81
61 E	KIII-2	7-23-13	715	1.43
61 C	KIII-6	7-24-13	240	.48
60 D	KIII-7	7-23-13	1045	2.09
60 E	KIII-8	7-23-13	1035	2.07
60 C	KIII-12	7-24-13	520	1.14
40 C	KIV-1	7-23-13	825	1.65
40 B	KIV-4	7-24-13	395	.79
42 C	KIV-7	7-23-13	1155	2.31
42 B	KIV-10	7-24-13	420	.84
44 C	KIV-11	7-23-13	875	1.75
44 B	KIV-14	7-24-13	415	.83
8(C.C.)	KIV-22	7-23-13	415	.83
		Field A-III.		
Plat Number.				
A-III-1	(N.C.)	7-28-13	620	1.24
2	(Early)	do.	550	1.10
3	(Late)	do.	545	1.09
4	(18" rows)	do	490	.98
5	(N.C.)	do.	555	1.11
6	(Early)	do.	660	1.32
7	(Late)	do.	520	1.04
8	(18" rows)	do.	495	.99
9	(N.C.)	do.	415	.83
10	(Early)	do.	830	1.66
11	(Late)	do.	830	1.76
12	(18" rows)	do.	645	1.49
13	(N.C.)	do.	855	1.71

16 August, 1913.

FIELD NOTES.

Huntley (continued).

The maximum temperature during the week of August 9 was 93, minimum 50; precipitation 1.14 inches.

Hauling in of second crop of alfalfa was completed.

Alfalfa, potatoes, beets, and corn in Field K were irrigated.

Oats in Fields M and K were harvested.

An alfalfa eradication experiment, using 10 plats of alfalfa planted in the orchard last season, has been started.

Two carloads of high grade Holstein cows have been imported from Wisconsin by the Huntley Dairy Association and have been distributed in lots of two to six to different farmers over the project.

BOOKS,
Technical, at Field Stations.

Only two of the farm superintendents have sent in their statements relative to technical books on field stations, as requested in the WEEKLY BULLETIN of June 21, 1913. In order that a comprehensive statement can be prepared for the use of all field men, it is desired that the superintendents submit their reports on this subject as soon as possible after the harvest season is over.

16 August, 1913.

CONDITIONS AT HUNTLEY.

Under date of August 4 Mr. Farrell wrote as follows concerning conditions on the Huntley Farm and Project:

"I was at Huntley from July 28 to July 31, inclusive. In general, things look very well at the Experiment Farm, but some of the details have been somewhat neglected because of the large volume of work Mr. Hansen has to attend to.

In the rotation field the alfalfa, beets, flax, and small grains are in fair condition. The beets look at least a third better than they did a year ago.

The potatoes are not in good shape. The seed was planted in dry soil and the resulting stands are extremely poor. Several of the plats have less than 20 per cent of a satisfactory stand.

To some extent the same condition obtains with the corn, but the difficulty is less with the stand than with the lack of uniformity of growth. Approximately one-half of the plants came up after the first irrigation, and there is great diversity in the stage of maturity.

All the winter wheat and most of the oats are harvested.

At the time I was there the second crop of alfalfa was in the cock. The hay was somewhat damaged by a rain of about 0.5 inch.

Up to the time I arrived no hogs had been pastured on the alfalfa plat in Rotation 65. Mr. Hansen stated that he had been unable to secure the necessary hogs near the farm and that he had not had time to go a long distance to get them. It is unfortunate that this has been neglected, for the growth of the alfalfa has been vigorous and some satisfactory results would probably have been secured. On the day I left the plat was fenced and Mr. Hansen stated that he would at once secure some hogs to pasture during the remainder of the alfalfa season and to use on the corn plat in the same rotation.

16 August, 1913.

Conditions at Huntley (continued).

Some of the plats in the rotations are beginning to show the effects of the preceding crop. This is particularly noticeable in the case of beets, where increased growth and vigor appear on the manured plats and on the plats where alfalfa was plowed under, and where the crops appear to be unfavorably affected by a preceding crop of oats.

The progress made with the pasture grass test has been extremely good. In the separate plantings, 8 of the 12 grasses planted have produced excellent stands and are making rapid growth. I think I have never seen better stands of grass anywhere. In the pasture mixtures, the one containing the 12 grasses plus thin seedings of white clover and alfalfa is very good. The other two mixtures were planted on extra heavy soil and have not done well. While there have been some practical failures in this test, there are enough successes to assure us that excellent pastures can be secured.

The beet planting-and-thinning test is a complete failure. The seed first planted was secured from Mr. Orton and it failed to make a stand. Mr. Hansen then got seed for replanting from the Billings Sugar Company, but the seeding was so late that a good stand could not be secured and the test was abandoned. (Mr. Aune has had the same experience at Belle Fourche with Mr. Orton's seed. Fortunately, the beet plats in the rotation fields both here and at Huntley were planted to seed secured from the sugar factories).

The crops on the Worden Tract are a surprise to everybody. Winter wheat planted on M-I and on the east side of the tract, where two crops of rye have been plowed under, looks as if it will yield at least 30 bushels. The winter wheat has had one irrigation. It was in the shock when I was there.

In M-I spring wheat, oats, two plats of beets, and two plats of alfalfa, planted last spring, look extremely well, considering the soil conditions. I think the beets look better than the beets on Field K looked a year ago. The alfalfa stands are

Conditions at Huntley (continued).

rather thin, but the growth is vigorous, the plants being about 15 inches high. Bridge readings are being made systematically on all the plats. Three complete sets have already beem made and there will be two more sets this year. The farmers around Worden are very much interested, Mr. Hansen says, and a number of them have stated that they will plant winter rye this fall to plow under next year. It will be very interesting to see what the alfalfa will do when it gets a few months older. It will probably be killed or its growth stopped, unless the drainage system is put in. This has not yet been started. The water table at the last reading (July 14) was about 3.4 feet below the surface. It had risen slightly during the preceding six weeks. I think it will be possible to publish a paper about the Worden work next winter.

Mr. Hansen and I thought the alfalfa between the orchard trees should be eradicated, and we outlined ten methods of eradication to be tried. An attachment to the 20th Century Grader was ordered for use in crowning.

The building is progressing satisfactorily. The mess house is completed, the bunk house (which was moved down from the old place) is being remodeled, and work on the office building will begin as soon as the builder's bond is accepted. When these three buildings are completed the living quarters will be very good indeed.

Mr. Hansen and I covered the project pretty well between Worden and Huntley. The crops look much better than they did a year ago. The sugar beets (of which I understand there are about 5500 acres) look specially good. Several farmers are getting into dairying. We visited two such farmers. One is milking six cows and selling sour cream in Billings at 26 cents. The cows are of poor quality and are poorly fed on dry alfalfa, green alfalfa and weeds. The cream sales have averaged $5.50 a month per cow since January 1. The other farmer is more up to date--milks nine fairly good cows and sells sweet cream in Billings at 40 cents. His sales have been from $8 to $12

Conditions at Huntley (continued).

a cow each month this year. Both these farmers want to pasture but they have decided that pasture grasses could not be made to do well on the project. Although they live within two miles of the farm, neither of them knew that grasses are being tested. They were very much interested in the results at the farm, and one of them decided to prepare six acres of his land for planting a pasture mixture next spring.

Several carloads of cows have been imported this year, but most of them have been taken to the bench northwest of the project. A shipment of two-year-old heifers from Wisconsin was expected to arrive at Huntley August 1. These will be distributed to farmers on the project. I did not learn definitely who is financing the importation, but I think the Billings and Huntley banks are backing it in some way."

FIELD NOTES.

Umatilla.

During the week of August 9 the maximum temperature was 101, minimum 52.

The third crop of alfalfa in C-1-d-e was given a second irrigation.

The small planting of white teparies, a native bean from Arizona, in field A-2 had matured and was harvested. The crop was small, due to the poor stand, but it is believed that teparies are a promising bean under these conditions.

Part of the variety test of corn is being cut to ascertaun the relative values for ensilage.

The earlier varieties of grapes are ripening.

16 August, 1913.

FIELD NOTES.

Belle Fourche.

The maximum temperature during the week of August 9 was 97, minimum 54; precipitation 0.26".

Irrigation of beets, corn, alfalfa, and potatoes in the rotations was completed.

Corn, beets, and potatoes in the irrigated rotations were cultivated.

Plat A-II-23 was reseeded to clover.

Plats A-II-7, 8, 9 were seeded to alfalfa and irrigated, and plat A-I-40 was seeded to rye.

Oats on fields O and P and flax on field F were harvested.

Threshing of all grain in dry land rotations was completed. The yields are as follows:

	Maximum.	Minimum.	Average.
Oats.....	40	13	24
Winter wheat....	36½	14	21
Barley.....	16	6	10
Spring wheat....	18	6	11

Mr. Farrell left the station on Thursday for Mitchell, S. Dak.

Mr. Kearney and Mr. Cole visited the station during the week.

San Antonio.

The maximum temperature during the week of August 9 was 100, minimum 65; greatest daily range, 33. There was no precipitation

Orchards were cultivated and weeded.

Fallow plats were cultivated.

Cocking of sorghum on A4-9, D4, and B3 was completed.

Plat A6-16 was plowed and subsoiled, and A6-18 was plowed.

The roads between the fields were cultivated.

The orchard on C8 was cultivated, weeded, and irrigated, which was then followed by a cultivation.

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FIELD NOTES.

San Antonio (continued).

Corn from plat A4-3 was gathered, but it was so green that it was decided to defer the remainder of the corn harvest until the crop is more fully matured.

Johnson grass and weeds around the flume were mowed.

Milo stubble on the rotation plats was cut to put the plats in readiness for plowing.

Irrigation of the nursery on A3 was started.

POST OFFICE BOX RENT.

The following letter from the Third Assistant Postmaster General to the Chief of the Bureau of Plant Industry is self-explanatory.

"In reply to your letter of the 16th instant, which the Chief Clerk of this Department has referred to me, relative to the payment of rent for boxes to be used for the reception of the official mail of Federal employees. I have to inform you that under the ruling of the Comptroller of the Treasury, to which you refer, a postmaster is required upon presentation by an official of the Federal Government of an application approved by the head of the Department or Bureau to which he is attached, for a delivery box for official use, to assign a box to his use, on condition that rent therefor be paid at the end of the quarter during which it shall have been used."

When post office boxes are needed for official use a written application to the postmaster should be drawn up and forwarded to the Chief of Bureau for approval before presentation at the post office. In this way advance payment of box rent by Department employees will not be necessary.

Conditions at Belle Fourche (continued).

acre) are conveniently arranged for a pasture capacity test if it is desired to conduct one later. The separate grass plantings did not do as well in the early summer as Mr. Aune thought they should, and they were plowed up. Mr. Aune no recognizes that this was a mistake, since it has been found in the case of the grass mixtures at Newell, and also at Scottsbluff, that the stands may thicken up considerably after midsummer.

Mr. Salmon is using 2-1/2 acres in Field A for tests of cereals under irrigation. He is growing four varieties of barley, five of oats, six of wheat, and three of flax, all in triplicate. The grains all look pretty well in the shock, but the flax is practically a failure. The flax was irrigated at flowering time, and the prompt dying of a large number of plants suggests that irrigation at flowering time is not a good practice. It may be desirable to test this at some of our farms next year in addition to the work at Huntley.

The crops in the rotation field all look good except the beets. These were first planted from seed sent out by Mr. Orton and the stands were so poor that new seed had to be secured from the Scottsbluff factory for reseeding. The fact that an excellent stand was secured from the seed from Brookings on a single plat on Field A-III, adjacent to and planted at the same time as several plats planted with the seed from Washington, shows that the difficulty was in the seed and not in the planting. The late planting has resulted in good stands, but the crop is very late and will probably not yield well. The distance-of-planting-and-thinning test had to be abandoned on account of the poor seed, as was the case at Huntley.

The alfalfa, both old and new seeding, looks extremely well. Perfect stands were secured on the spring seeded plats. The alfalfa has been irrigated four times, but it is probable that one more irrigation would have been desirable. The second crop received two irrigations, and Mr. Aune thinks

Conditions at Belle Fourche (continued).

three would have produced more hay and also given the third crop a better start.

The corn and potatoes are in good shape. The stands of corn are practically perfect and the growth is uniform on each plat. As was the case at Scottsbluff, a decided depression was noted where corn followed beets. The depression becomes less noticeable as the season advances, but some indications are still present. A census I made of all the potato plats showed that the average of the stands on all the plats is 89.7 per cent perfect, calculated on the basis of the distance of planting. The vine growth is very heavy, particularly where the crop follows alfalfa or where manure has been applied.

In rotation 65, the three hogs on alfalfa pasture made a gain of 90 pounds in the 39 days from May 24 to July 2. This is equivalent to $13.20 an acre for the alfalfa, after deducting the cost of the grain fed—a mixture of equal parts of wheat, oats, and barley. We weighed the hogs again on August 6 and found that the value of their gain during the second period (81 pounds) lacked 19 cents of paying for the grain fed during the period. The hogs are too old to make the most economical gains. They averaged 153 pounds on May 24, and 183 pounds on July 2. Furthermore, the plat is not divided, as at Scottsbluff, and the pasture is over-grazed. To make the work pay out, it will be necessary to divide the plat, to use younger hogs, and to irrigate more liberally. While the hogs were comparatively young, during the first period, and the alfalfa was kept growing, the gains were fairly satisfactory. Thirteen dollars an acre in 39 days, while not as good as the returns at Scottsbluff (where, incidentally, corn was fed instead of the small grains) is a fair return and indicates good possibilities. Mr. Aune will get some younger hogs for the rest of the alfalfa season and for hogging off the corn.

23 August, 1913.

Conditions at Belle Fourche (continued).

We outlined a set of experiments with fall irrigation similar to those at Scottsbluff. It is planned to run these experiments in duplicate and that they will occupy 28 quarter-acre plats in Field O. We planned to use 7 crops—wheat, oats, barley, corn, flax, beets, and potatoes. It is probable that fall irrigation will prove to be advantageous both in reducing the difficulty of plowing and in increasing yields. In addition to the above, 10 quarter-acre plats of spring-seeded alfalfa are to be used for a fall irrigation test with that crop and for some other irrigation trials.

The trees on the farm suffered heavily from the effects of the low temperatures last winter. A large number of cottonwoods were killed outright; oleaster was badly frozen back (but is recovering well), and all the others except green ash and locust were more or less damaged. Mr. Aune expects to get some native cottonwoods for planting on the farm.

The outlook at Belle Fourche is extremely encouraging. While the crops are not as big as they are at Scottsbluff and (in some cases) at Huntley, the effects of the different treatments are beginning to be apparent, and the fields are getting into such a condition that effective experimental work can be done. With a man to take charge of the rotation work next year, so that details can be more closely looked after, we can look forward to getting a large volume of very satisfactory results."

23 August, 1913.

FIELD NOTES.

Truckee-Carson.

During the week ending August 9 the maximum temperature was 95°, minimum 52°.

All the hay except the alfalfa varieties on fields D and F was cut and the stacking was nearly completed.

A cloudburst occurred Sunday night, August 3, between Fernley and Derby Dam. The torrents of water coming down the ravines on the south side of the Truckee canal caused between 20 and 30 earth slides into the canal, so that all flow from the Truckee-River was cut off. A large force of men and teams was sent up from Lahontan to repair the breaks. Water was turned back into the canal on the 8th.

San Antonio.

The maximum temperature during the week ending August 16 was 99°, minimum 69°; greatest daily range 29°. The total precipitation was 0.32 in.

Plowing of milo stubble in the rotation fields was started and continued throughout the week, the following plats being plowed: A4-12 and 16; A5-2, 5, and 9; A6-6 and 14; B4-16 and 19; and B5-18.

Manuring of milo plats receiving such treatment was started.

Irrigation of the nursery was completed, after which it was cultivated.

Ground plantings and lawns were again watered.

Dwarf milo planted last month was irrigated and cultivated. This crop is making excellent growth.

Japanese sugar cane and Teosinte were also irrigated.

A part of the cotton on D3 was weeded.

The rotation fields were gone over and stray plants of Johnson grass cut.

23 August, 1913.

FIELD NOTES.

San Antonio (continued).

Fallow plats in the rotation experiments and some other fallow fields were cultivated.

Dr. D. A. Saunders, of Greenville, Texas, spent Monday at the farm harvesting corn in the variety test made for the Texas Corn Growers' Association.

Messrs. Meade and McKeever made a trip to Victoria, Texas, to assist in corn harvesting at that place.

Umatilla.

During the week of August 16 the maximum temperature was 95°, minimum 46°; greatest daily range 37°.

The third crop of alfalfa was put up during the week.

The rye in the orchard and vineyard is being cut preparatory to disking and reseeding.

The variety test of potatoes was dug.

The following results were obtained from cutting the variety test of corn for ensilage.

Variety.	Length of rows. (Feet)	Weight. Pounds.	Condition.	Computed weight per acre.
Disco White Dent	600	256	Dry	6406 lbs.
Golden Dent.....	600	432	Little dry	9123 "
Leaming.....	568	256	Dry	5701 "
Minnesota No. 13	568	270	Dry	6033 "
Minnesota No. 23	540	222	Dry	5210 "
Stanford's White Flint....	524	318	Green	7083 "

The Extension Department of the Oregon Agricultural College, cooperating with the Department of Agriculture, have placed in eastern Oregon, with headquarters at Hermiston, a dairy expert, Mr. M. J.

23 August, 1913.

FIELD NOTES.

Umatilla (continued).

Lazelle, whose duties will be to assist the farmers along the lines of dairying. Mr. Laxelle and Mr. W. A. Byer, the western Oregon expert, have been on the Project during the past week, visiting the Experiment Farm Sunday.

Belle Fourche.

During the week ending August 16 the maximum temperature was 104°, minimum 57°.

Threshing continued throughout the week.

Alfalfa in fields K and M was irrigated.

Potatoes and beets in field A rotations were irrigated.

Alfalfa in fields O and P was harvested.

The following yields were obtained from alfalfa plats in field A, irrigated rotations.

(Spring Seeding).

Series.	Plat.	Pounds. per plat.	Pounds. per acre.	Tons per acre.
I	2	130	520	0.26
I	6	130	520	0.26
I	11	92	368	0.18
I	15	60	240	0.12
II	9	96	384	0.19
II	15	140	560	0.28
II	20	364	1456	0.73
III	15	170	680	0.34
III	20	306	1224	0.61

23 August, 1913.

FIELD NOTES.

Belle Fourche (continued).

Field A — 1912 Seeding.

Series.	Plat.	Pounds per plat.	Pounds per acre.	Tons per acre.
I	3	398	1592	0.80
I	7	382	1528	0.76
I	12	314	1256	0.63
I	13	370	1480	0.74
I	51	542	2168	1.08
I	S.of road	378	1512	0.76
I	N.of road	324	1296	0.65
II	10	484	1936	0.97
II	11	444	1776	0.89
II	16	482	1928	0.96
II	17	520	2080	1.04
II	21	810	3240	1.62
II	29	456	1824	0.91
II	30	508	2032	1.02
II	S.of road	514	2056	1.03
II	N.of road	554	2216	1.11
III	16	658	2632	1.32
III	21	779	3116	1.56
III	23	860	3440	1.72
III	24	878	3512	1.76
III	S.of road	506	2024	1.01
III	N.of road	478	1912	0.96

Yuma.

During the week of August 9 all cotton plats and nursery checks were irrigated.

The Sesbania seeded on A15-3 as a green manure crop was plowed under.

A variety planting of beans was made on A12-3.

Field A13-4 was sown to cowpeas.

Seed alfalfa fields C42, 43, and 44 were harvested.

Alfalfa for hay was cut on E1 to 6.

Fields C28, 39, and 40 were renovated.

23 August, 1913.

FIELD NOTES.

Yuma (continued).

Brown Kaoliang stalks on D21 and 23 were cut and removed. An effort is being made to grow a second crop from the early plantings of grain sorghums.

Three hundred and eighty No. 29391, Seedling Menakher dates were moved from the date nursery to permanent location along the south road of farm,

The fig orchard was disked and hoed.

Grain sorghum plantings on D were cultivated.

Scottsbluff.

During the week ending August 16 nearly all of the alfalfa was seeded in the stubble.

Most of the week was devoted to cutting weeds.

On Monday, August 11, occurred one of the hardest rain storms ever seen in that section of the State. In less than an hour 2.25 inches of rain fell, and after this downpour the rain continued until 11.00 p.m., the total precipitation being 3.30 inches. The flood water caused considerable damage in some localities. Many of the ditches were washed out, and bridges and culverts on many of the roads are gone. The Tri-State ditch broke out just south of the Experiment Farm, flooding much of the country between there and the river.

Many reports are coming in that potatoes on the project are rapidly taken with curly-top. Most of the early potatoes are out of danger, only the late varieties and the late plantings being affected.

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FIELD NOTES.

Yuma.

During the week of August 16 alfalfa fields D-6 to 16 were harvested, and C-42 to 45, row plantings, were cultivated.

The alfalfa on B, D, and E was irrigated; also date and eucalyptus plantings on roads 1 to 8.

Garden plat A12-2 was manured.

The harvesting of broomcorn on A3 was finished and partly threshed.

Cowpeas were sown on C21.

The Yuma "Sun" of August 22 states that a local concern is cleaning alfalfa seed at the rate of a carload a week and now has five carloads of seed in the house.

Belle Fourche.

The maximum temperature during the week ending August 16 was 104°, minimum 51°.

Alfalfa in the rotations and in fields O and P was irrigated.

Alfalfa in the time-of-seeding test in field A was harvested and stacked, and alfalfa in fields O and P was stacked.

All potatoes in the irrigated rotations were cultivated.

Oats in fields O and P and in fields I and K were stacked.

Harvesting of grains in the irrigated rotations was completed.

Grounds were mowed and irrigated.

Rate-of-seeding alfalfa in field I, pasture experiment in field K, and forest were irrigated.

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FIELD NOTES.

Truckee-Carson.

The maximum temperature during the week ending August 16 was 89°, minimum 46°.

The work of hauling and stacking the alfalfa hay was completed. The plat yields are given below:

Yields, Second Cutting Alfalfa.

Plat.	Area.	Yield.	Yield per acre
	Acres.	Pounds.	Pounds.
N 9 - 10	.37	2275	6140
Z 2b to 6b inclusive	1.5	3450	2300
D 3	.54	400	740
4	.54	500	926
5	.54	575	1065
6	.54	65	120
7	.54	60	111
F 5	.30	650	2166
10	.34	700	2060
11	.44	225	512
12	.76	2200	2900
13	.60	350	584
14	.60	1200	2000
16	.52	1275	2450
17	.43	1425	3315
18	.37	1125	3040
19	.35	975	2785
20	.35	775	2215
21	.35	625	1785
22	.32	190	594
23	.32	675	2110
24	.32	450	1407
25	.32	300	937
26	.32	225	703
27	.32	325	1015
29	.39	600	1540
30	.39	575	1475

30 August, 1913.

FIELD NOTES.

Umatilla.

The maximum temperature during the week ending August 23 was 94°, minimum 42°.

The soil moisture experiment plats in B-1c were irrigated for the last time and sampled.

Following are the potato yields in the variety test:

	Pedigree	Hills Planted	Hills grew.	per cent grew	Total yield (lbs)	Market-able (lbs)	Per-cent-age.
American Wonder.	Local'12	238	233	98	283	165	58
Burbank.....	UEF[2]	122	60	49	37	21	57
Early Ohio.....	US UEF	118	99	84	100	64	64
Early Ohio.....	UEF[2]	98	68	69	63	44	70
Early Ohio.....	USDA	87	69	79	91	63	69
Early Rose.....	UEF	128	26	20	17½	8½	42
Factor.....	USDA UEF	140	5	3	2	½	25
Green Mountain..	USDA UEF	126	18	14	11	5	45
Green Mountain..	USDA	49	43	87	31	15	48
Irish Cobler....	USDA UEF	233	34	14	13½	7	51
Irish Cobler....	USDA	41	39	96	30	21½	74
Mechanic.....	Utah '12	28	28	100	15	7	46
Netted Gem.....	Local'12	128	71	55	106	77	73
Peachblow.....	UEF[2]	221	126	57	58	28	48
Pearl.....	USDA UEF	122	33	26	24	14	59
Pearl.....	USDA	46	44	93	40	29	68
Rural New Yorker	USDA UEF	128	9	7	10	7½	75
Rural New Yorker	USDA	44	44	100	45	25	55
Somers Ext Early	USDA UEF	122	37	30	25	14	58
Somers Ext Early	USDA	47	41	87	11	4½	40
Up-to-Date.....	USDA UEF	117	41	35	44	23	52

UEF—Seed grown on Umatilla Experiment Farm in 1911 and 1912.
UEF[2]—Seed grown on Umatilla Experiment Farm in 1912.
USDA—Seed received from Department of Agriculture in 1913.
USDA UEF— Seed received from Department Agriculture in 1912 and grown on Umatilla Experiment Farm in 1912.

30 August, 1913.

FIELD NOTES.

Umatilla (continued).

Secretary of the Interior Lane visited the Project on Tuesday. In the morning he inspected the sandy soils north of the Experiment Farm and in the afternoon the silt soils in the vicinity of the reservoir.

The Secretary informed the settlers that he would do all in his power to secure an extension of payments until the land was producing. He stated that the first unit of 10,000 acres on the West Extension had been authorized with a building cost of $80, and that the beginning of actual construction now depended upon the signing up of the holdings of the Ladd interests.

Scottsbluff.

During the week of August 23 nearly all of the threshing was finished. The yields will be given next week.

The alfalfa that was seeded August 14 into the stubble is making good growth. The grasses seeded at the same time are just coming through and the indications are at present that there will be a good stand.

The land for the winter wheat was plowed and put in condition for seeding.

Messrs. Knorr and Jacobson attended the meeting at North Platte during the week.

Huntley.

During the week of August 16 Mr. Farrell was at the station. Mr. Farrell and Mr. Hansen, in company with Mr. Scilley and other Billings Sugar Company officials made a trip to Edgar and Fromberg on Saturday, visiting the Sugar Company's experiment farm at the former place and several ranches near Fromberg.

30 August, 1913.

FIELD NOTES.

Huntley (continued).

The dry land grains and winter wheat on the Worden Tract were threshed. The yields are as follows:

Plat number.	Crop.	Date harvested.	Yield. per plat	Yield. per acre
			(Pounds)	(Bushels)
M-I- 1	W.wheat	July 15, 1913	494	31.78
2	do	do	594	38.21
3	do	do	586	36.5
4	do	do	588	37.83
5	do	do	638	41.05
6	do	do	662	41.31
7	do	do	482	31.01
8	do	do	477	30.68
9	do	do	511	31.9
10	do	do	457	29.4
13*	S.wheat	July 20, 1913	195	13.0
14*	Oats	do	75	9.0
16	do	do	275	34.37
17	S.wheat	do	360	24.0
19	Oats	do	384	48.0
M-II	W.wheat	July 14, 1913	11644	28.7

* The low yields on these plats are largely due to neighbors' chickens.

During the week of August 23 grains in Field K were threshed, excepting two plats of oats and three of spring wheat.

Alfalfa in Fields K, A, and B, and potatoes and beets in Field K were irrigated. This will probably be the last irrigation for this season.

Five acres of land adjoining Series M-I is being broken for the purpose of having a series of check plats opposite those in M-I.

The bunk House addition is nearing completion and work is being pushed on the office building.

30 August, 1913.

FIELD NOTES.

Huntley (continued).

Yields of Grain, Field K.

Crop.	Plat number.	Rotation number.	Yield. per plat. (Pounds)	Yield. per acre. (Bushels)
W.wheat	K-II-7	7a	875	58.3
do	K-II-8	5a	929	61.9
Oats	K-III-4	61a	930	116.2
do	K-III-10	60a	693	86.6
do	K-III-13	31a	621	77.6
do	K-IV-6	25a	1015	126.8
do	K-IV-13	44a	648	81
do	K-IV-15	30a	687	85.9
do	K-IV-18	32a	473	59.1
do	K-V-1	16a	683	85.3
do	K-V-8	22b	774	96.7
do	K-V-9	24a	872	109
do	K-V-16	23b	675	84.3
do	K-V-20	27a	564	70.5
do	K-V-21	1	303	37.8

Yields of Grass Mixtures on Field A-II.

Plat number	Date Harvested.	YIELD. per plat. (Pounds)	YIELD. per acre. (Tons)
A-II-3	7/29/13	795	1.59
4	7/31/13	680	1.36
5	8/14/13	1050	2.1
6	7/29/13	1055	2.11
7	8/14/13	800	1.6
8	8/14/13	815	1.63

6 September, 1913.

FIELD NOTES.

Belle Fourche.

The maximum temperature during the week ending August 30 was 99, minimum 45.

Brome grass and grain nursery in field G were threshed, as was also the remainder of the wheat in field A.

Beets in the rotations, pasture experiment in field K, and alfalfa rate-of-seeding experiment in field I were irrigated.

Work on fall plowing plats in dry land rotations is nearly completed.

Alfalfa in field K was mowed and cocked.

All alfalfa and sugar beets in field A were irrigated.

Pasture experiment in field K and alfalfa in field I were clipped.

Umatilla.

The maximum temperature during the week ending August 30 was 96, minimum 50; greatest daily range, 44.

Eggplant and watermelons were shipped to the Oregon Agricultural College for the purpose of making storage determinations.

Field D-3 and field D-4 are being prepared for seeding to alfalfa.

Work was begun by plowing in the rye in the orchards preparatory to planting a winter cover crop of vetch.

Mr. Byron Hunter, of the Office of Farm Management, visited the station and drove over the project two days during the week.

Mr. G. F. Harden, of the Office of Irrigation Investigations, visited the project Friday.

6 September, 1913.

FIELD NOTES.

San Antonio.

The maximum temperature during the week ending August 23 was 100, minimum 68; greatest daily range, 29. The total precipitation was 0.38 inch.

Husking of corn on the rotation plats was completed, and the yields are given below:

Plat.	Yield.			Number plants per acre	Percentage of Stand.*
	Per plat	Per acre.			
	(Pounds)	(Pounds)	(Bushels)		
A4-3	538	2152	30.7	5436	103
A4-8	377	1885	26.9	4665	88
A6-7	746	2984	40.3	5152	98
A6-9	650	2600	35.7	5032	95
A6-11	667	2668	38.1	4700	89
A6-13	646	2584	36.9	5184	98
A6-15	692	2768	39.5	5140	97
A6-17	656	2624	37.4	4496	85
B5-1	580	2320	33.1	5044	96
B5-2	554	2216	31.7	4904	93
B5-13	596	2384	34.1	5168	98
B5-15	684	2336	33.4	4996	95
B6-1	640	2560	36.6	5060	96
B6-3	691.5	2766	39.5	5548	105
B6-5	543	2172	31.0	5164	98
B6-7	584	2336	33.4	5024	95
B6-9	626.5	2506	35.8	5156	98
B6-11	651.5	2606	37.2	5144	97
B6-13	627	2508	35.8	4588	87
B6-15	582	2328	33.3	3924	74
B6-17	560	2240	32.0	3632	69
Average			34.9	4912.2	93

* Computed on basis of 5280 plants per acre.

6 September, 1913.

FIELD NOTES.

San Antonio (continued).

The percentage of stand was obtained by considering 5280 plants per acre perfect, or 100%. That is, the number of plants on an acre with the plants 2 feet apart in rows 4.1 feet apart, which is what is usually considered a standard at San Antonio.

The principal deductions from the table are that manuring proved detrimental during the present season, subsoiling slightly increased the yields in most instances, and the advantages of a suitable rotation are noticeable in the effect on the yield of corn, the highest yield being obtained on plat A6-7, which was grown in a rotation of corn and oats where the land is plowed immediately after the preceding crop is removed.

Failure to obtain a good stand on spring-plowed plats makes it difficult to judge the effect of that treatment. While the yields are somewhat lower than on plats plowed in the fall but with other treatment similar, the stand is so poor that the low yield might be explained by that fact. The poor stand on these plats and also on the adjacent fall-plowed plat, B6-17, was largely due to the white grubs, which it is believed either remained through the winter in the unplowed land or came out of the adjacent stubble of weeds.

Field work for the week consisted of husking corn and picking cotton. Extra help was used in picking the cotton in the thinning experiment on C3 and D3.

Prof. John A. Todd, formerly Professor of Economics of the Khedival School of Law at Cairo, Egypt, and now connected with the Nottingham University, of Nottingham, England, who is in this country studying cotton marketing, spent one day at the farm and in San Antonio.

Mr. Hastings returned to the station on Tuesday after visiting a number of State Experiment Stations in the Middle West.

6 September, 1913.

FIELD NOTES.

Truckee-Carson.

The maximum temperature during the week ending August 23 was 95, minimum 42.

Sufficient water was obtained on the 22nd to irrigated the nursery and gardens, but on account of the scarcity of water the field crops were not irrigated.

Yuma.

During the week of August 23 alfalfa fields C-6, 7, and D-27 were harvested, and D-6, 7, 10 and 12 were renovated.

The first and second plantings of Sudan Durra on fields D-21 and 23 were harvested. The stalks were cut and removed.

Lands A-14-2 and 15-1 were plowed, and A-15-1 was reseeded to cowpeas.

The work of threshing broomcorn on A-3 was completed.

Date lands A-16 and 17 were disked and 18 to 21 and deciduous orchard were furrowed for irrigating.

Roads 1 to 8 have been disked and numerous small plats hoed and cultivated.

Considerable humidity has been experienced the past two weeks. Rainfall, 0.23 inch.

A large acreage of seed alfalfa has been harvested in the Valley, part of which has been threshed. The yields per acre are better than last year; one farmer reporting a yield of 19,000 pounds of seed from 20 acres.

Scottsbluff.

During the week of August 30 the weather continued hot and dry.

Irrigation was started on Monday and three men were kept at the work during the week. The progress in irrigation is slow, as the soil is taking up a large amount of water.

6 September, 1913.

FIELD NOTES.

Scottsbluff (continued).

A pump has been put in at the new well and a pipe line connected with the storage and pressure tank.

On Field K, the irrigated rotations, the following yields were obtained:

Oats following	Alfalfa	Corn	Beets	Flax	Oats	Potatoes.	Wheat.
Maximum	101.3	58.8	90.0	86.5	72.8	99.3	76.8
Minimum		52.5	88.8			86.5	72.0
Mean		55.9	89.4			92.1	74.4
Number of plats.	1	3	2	1	1	8	2

Wheat following	Alfalfa	Beets	Oats	Wheat
Maximum	38	33	23.2	28.3
Minimum				25.9
Mean				27.1
Number of plats	1	1	1	2

W. Wheat continuous..... 30.6 bushels.

Alfalfa, old seeding; second cutting.

Maximum.	Minimum.	Mean.
2.37 ton	2.01	2.16

Alfalfa, fall seeded.

1.94	1.64	1.74

Mr. Link, of the State University, spent two days at the station in connection with potato work.

6 September, 1913.

FIELD NOTES.

Huntley.

During the week of August 30 irrigating of alfalfa and potatoes in Field K was completed.

Stand counts have been made of all of the grain plats and plats in cultivated crops in field K.

Winter wheat stubble in M-I is being plowed.

All grain plats in Field K so far threshed have been disked.

Oats in Field C were harvested.

Grain Yields, Field K.

Crop.	Plat Number.	Rotation Number.	Yield. per plat. (Bushels)	Yield. per acre. (Bushels)
Oats	K-IV-8	42d	825	103.12
Wheat	K-V-4	18b	542	36.12
Oats	K-V-17	28a	340	42.49
Wheat	K-V-18	28b	262	17.44
Wheat	K-V-23	3(cc)	423	28.20

Flax yields will be reported later.

DISAPPOINTMENTS IN IRRIGATED LANDS.

Under the above heading the New York Times Annalist of September 1 publishes extracts from Mr. Scofield's article in the 1912 Yearbook on "The Settlement of Irrigated Lands".

13 September, 1913.

CONDITIONS AT UMATILLA.

Under date of September 4, Mr. Farrell wrote as follows:

"I was at the Umatilla Farm from August 30th to the morning of September 3rd. In most respects the work at the Experiment Farm is progressing satisfactorily, although there are some exceptions. Mr. Allen is getting some very good results considering the difficulties under which he is working. One of the chief difficulties with the experimental work is being met on the north (higher side) of the farm where the sandy soil is extremely deep and the amount of irrigation water required excessively large. On this part of the farm, Mr. Allen has water two days out of six and with the quantity of water available he has had considerable difficulty in keeping some of the crops growing. This is particularly true in the case of red clover, alfalfa, and sweet clover, which were planted at the extreme north side of the farm in connection with the soil improvement work. The red clover and alfalfa are failures, due almost entirely to lack of water. The sweet clover looks only fairly well. This ground is being prepared for replanting to these three crops in the immediate future.

With the limited amount of water available, it has been necessary for Mr. Allen to favor the tree plantings, and in order to save them, the other crops have been made to suffer. Mr. Allen stated that it is likely the Reclamation Service will be able to make some more satisfactory arrangement next year. This will certainly have to be done if our experimental work on the north half of the farm is to be adequate.

The entire crop of tomatoes on the south side of the farm failed this year because of blight. The experiment of growing eggplants, melons, and cantaloupes, with 12'x14' garden frames is producing some good results. Each of the above crops grown in these frames is grown (a) under glass, (b) under burlap, (c) under glass with manure, and (d) under burlap with manure. The eggplants look particularly well. Manure has proved beneficial for eggplants and cantaloupes, but the water melons have done best without manure. The variety

Conditions at Umatilla - continued.

test of cantaloupes in which ten sorts are being tested is giving some fairly good results. In the test of two varieties of asparagus, yields have been determined and counts have been made of the male and female plants. Beginning in 1913 each of the 10th acre plats used in this test will be divided, and one-half of each will be treated with a nitrate fertilizer.

The variety test of water melons includes 19 varieties most of which are looking fairly well. Some of the most promising are some recent S. P. I. introductions, of which there are nine.

Some very interesting results are being obtained in the grape experiments. Many of them are making a good growth, and some, particularly, the Wordens, will yield rather heavily this year. There is a wide diversity in the vineyard among the different varieties, with respect to the productive and vegetative vigor. Some of the most productive are weak vegetatively, and a number of the varieties which are vegetatively strong are not very productive. Mr. Allen is planning to do some work with these varieties with the view of top working productive sorts on the roots of some of the varieties which are notably strong in a vegetative way. He hopes to be able to visit the Geneva, N. Y. station on his way to Washington this fall, since he says the Geneva people have done a lot of this kind of work. The growth of the trees in the orchard planted on the slope is still extremely slow in most cases. The cherry varieties appear to be failures. The peaches look very much better.

In the experiment in which peaches are planted on two-year-old alfalfa sod and on raw soil, the growth is fairly satisfactory. Mr. Allen plans to divide this field into four sections, beginning next spring, and to treat them as follows: one-half of the field which was in alfalfa to be planted to rye annually, one-half to be planted to rye and vetch annually, and one-half of the field of raw soil to be similarly treated.

The commercial fertilizer experiment on the land east of the barn is showing some rather interesting variations. The entire field is in corn this year.

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Conditions at Umatilla - continued.

The most noticeable beneficial effects appear to have been produced by nitrate fertilizers and by manure. No increase is noticeable on the plots where phosphate has been added. The soil on this entire field is rather spotted, so that a comparison between any two plots is not likely to be very reliable but some valuable information is likely to be gained through the fact that the effect of the ferlizers on the soil will be chemically determined from time to time.

A planting of soy beans on the south side of the farm this year has shown that this crop may produce fairly well with a very small quantity of water. Mr. Allen says that it has been impossible for him to get sufficient water to keep the land moist where these beans are growing and that the crop has been subjected to very dry conditions for long periods during the year. The growth at the present time indicates that these beans might possibly be a valuable crop on this soil under conditions where the water supply is rather short.

Some damage has been done this year by grasshoppers. In the experiment on the north side of the farm where apple trees are being irrigated at weekly and bi-weekly intervals, respectively, the trees have been almost completely defoliated, and orchard trees in a number of the other plantings have been seriously damaged.

Mr. Allen and I spent about a day and a half driving over the project and paid some attention to the district to which the Secretary of the Interior referred in his recent correspondence. This is the very sandy district lying immediately north of the Experiment Farm. The north half of the farm itself is fairly representative of the district. The sand varies in depth from about five or six feet at the middle of the experiment farm to probably one hundred feet or more at the top of the ridge north. At the north side of the farm the depth of the sand is probably thirty feet or more. It is in this district where the greatest amount of difficulty has come in the necessity of the use of a very large amount of irrigation water. The entire district contains in the neighborhood of 5,000 acres.

13 September, 1913.

Conditions at Umatilla - continued.

"Under the circumstances, I thought it undesirable for me to inquire more than in a general way into the conditions, but from Mr. Allen I learned a few facts which will be of interest to you. At the time of the Secretary's visit, he held a meeting on the farm of Mr. T. W. Botkin, a short distance north of the experiment farm. I understand that at this meeting the difficulties of crop production on this sandy soil were brought to the Secretary's attention, and that it was here he stated that he would have a soil expert from the Department make an investigation in conjunction with some man appointed by the Governor of Oregon.

After Mr. Allen and I had driven over the sandy section, it seemed to me that the essential difficulties are these:- the soil is extremely coarse, sandy, and deep. Irrigation water must be applied very frequently. Crops dry up within five to ten days after a heavy irrigation. Mr. Botkin reported that he irrigates his alfalfa once every six or seven days from April 1st to October 1st. On this basis he will probably apply in the neighborhood of fourteen acre feet per acre. Orchards in the same locality have to be irrigated about every seven days during their first year, and about every twelve to fifteen days suring the second year. This necessity for frequent irrigation greatly increases the expense of crop production. It seems further, that the soil is relatively unproductive. Mr. Allen says that in many cases even where irrigation water is applied with sufficient frequency, the plant growth is very slow. Still it is interesting to note that on seven acres of alfalfa, Mr. Botkin expects to obtain a yield of about forty tons during the present year. Four crops will be cut. Another farmer in the same section has eight acres in alfalfa which he irrigated seventeen times up to the time of cutting the third crop; about three more irrigations will be required. With alfalfa selling at $5 to $7 a ton, it is evident that these farmers cannot hope to hold out on this soil. There is a possibility, I think, of arriving at a solution of the matter by providing a better market for the alfalfa, and this can best be done, of course, through the use of livestock. Either way you look at the situation, it is extremely serious,

Conditions at Umatilla - continued.

since most of the farmers are unable to buy livestock.

We visited another farmer on the project a short distance west of Hermiston, who has only ten acres of land. On this he is keeping nine good milk cows and a few hogs. A part of his product he sells in town as milk and the remainder is sold as cream at 29¢ a pound, butter fat. His nine cows bring him in from $110 to $125 per month during the year. It is certain of course that the conditions on this farm are much more favorable to crop production than they are in the sandy region, but even considering this, the fact that Mr. Botkin is producing something over five tons of alfalfa per acre, indicates that there is some possibility in the livestock industry even for the sand farmers.

There has recently been quite an increase in the number of farmers on the project who have gone into dairying. The dairy field man recently placed at Hermiston by the Oregon people cooperating with the Dairy Division told me that there were in the neighborhood of 500 cows now being milked in the locality. He was not sure just how many of these are on the project proper, but from the number of small herds we saw, it is evident that a great many of the farmers are taking up this work.

Mr. Byron Hunter made a short visit to the project just a few days before I arrived. He did this, I understand, informally, in order to get a general survey of what he would have to do in case the proposed investigation is made by himself and an Oregon man.

When the matter was placed before the Governor of Oregon, he referred it to the Agricultural College, and President Kerr referred it to Professor Lewis. Professor Lewis summed up the situation on the Umatilla Project as he saw it and sent a letter embodying his views to President Kerr. A copy of this letter was sent to Mr. Allen. Professor Lewis was surprised that the statement had been made that the experiment farm was not so located as to be representative of the sandy soils and he stated very emphatically that such a report was without foundation. He emphasized the difficulty in connection with the large

13 September, 1913.

Conditions at Umatilla - continued.

quantities of water required, the relative unproductiveness of the soil, etc., in short, his views very closely correspond to your own as expressed in your letter to me.

It will be of interest to you to know that the blowing of the sandy soil is getting to be less of a difficulty than it formerly was. In the first place, the Russian thistles have proved extremely effective in holding the soil. This fact is noticeable all over the project. In the second place, the farmers are finding that the soil can be held very effectively by scattering rye straw over the surface of the ground and disking it in after planting alfalfa. Mr. Allen has found this method extremely satisfactory at the experiment farm. A farm which I visited last year and which at that time was entirely unproductive on account of sand blowing has been taken up by a new farmer who is now getting it successfully planted to alfalfa. I took a photograph on this farm or near it last year, and I think you will find a copy of it in the files. The label on the photograph mentions the name of McDonald, the previous owner of the farm. I have taken another photograph on the same farm recently, showing the method of disking in the rye straw and otherwise handling the land to prevent soil movement. I think that in the great majority of cases, the mere blowing of the soil is no longer a very important factor, particularly when considered in comparison with the large quantity of water required.

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********** (Signed) F. D. Farrell.

13 September, 1913.

FIELD NOTES.

Truckee-Carson.

The maximum temperature during the week ending August 30 was 96, minimum 58.

The stand of alfalfa on plats C-11 and 24 was not sufficiently good to leave without re-seeding. All the plats except C-23, which had a good stand, were therefore plowed, to be re-seeded next spring.

All weeds were cleaned out of the alfalfa seed plat D-8. The work of removing all brush and weeds from the tank house hill was begun. This growth had been left on during the summer to protect the hill from winds.

The grain varieties at the Indian School were threshed and yields obtained as follows:

	Area.	Yield.	
		Total	Per acre.
		Pounds	Pounds
Swan Neck Barley.....	.89	650	730
*Big Four Oats.....	...	...	...
Swedish Select Oats..	.50	330	660
Early Mountain.....	.10?	160	1600
Arnautka Wheat.....	.27	330	1222
Gluika Wheat.....	.27	510	1889
Fretes Wheat.....	.20	410	2050
Haynes Blue Stem.....	.20	350	1750
Galgalos.....	.20	290	1450

* No stand.

13 September, 1913.

Truckee-Carson (continued)

COMPARATIVE WEATHER RECORDS FOR AUGUST.

	1913	1912	Average of All Records
Maximum temperature..	96.0	97.0	103.00
Minimum temperature..	42.0	39.0	36.00
Mean temperature.....	71.85	68.20	71.14
Rainfall.....	0.94	0.18	0.09
Wind velocity.....	2.3	3.62	3.66
Evaporation.....	7.97	9.03	9.80
Days clear.....	15	27	26
Days cloudy.....	5	2	2.4
Days partly cloudy...	11	2	2.6

Yuma.

Precipitation during week ending Aug. 30 was .37 inches.

Fallow lands A-13 5, 6, and 7 were plowed.

Fields A 14-2 and C 21 were sown to cowpeas.

During the week the line fence on the north side of the farm was constructed.

Lands as follows were irrigated: date, fig, and deciduous orchards, grain sorghums, alfalfa row plantings on C, roads 1 to 8, E1 to 9, and most of the cotton.

Alfalfa was harvested from fields B9 to 12, 31 and 32. Grain sorghum (var. Brown Kaoliang and Sudan durra) was cut from D25. Sudan grass on A 15-4 and Sudan and Tunis grass on A 10-2 was mowed and stacked.

13 September, 1913.

Yuma (continued)

The fourth cutting of alfalfa was weighed and stacked. The acre yields are as follows:

Field.	Yield. Total. Pounds.	Yield. Tons. per acre.
CHILIAN.		
A-6	1050	1.05
7	670	.67
8	750	.75
9	400	.40
B9 and 10	1380	.69
B11 and 12	1540	.77
B31 and 32	2140	1.07
C-6	480	.48
7	650	.65
D-6 and 7	1560	.78
D-8 and 9	1940	.97
D-10	930	.93
11	810	.81
12	890	.89
13	1140	1.14
14	990	.99
15	1050	1.05
16	1000	1.00
27	1120	1.12
E-5 and 6	1950	.98
PERUVIAN.		
E-1 and 2	1950	.98
E-3 and 4	1650	.83

13 September, 1913.

FIELD NOTES.

San Antonio.

The maximum temperature for the week ending August 30 was 101, minimum 64, and greatest daily range 34.

Orchards and fallow land were cultivated the first part of the week. Corn stalks on the rotation plats were cut preparatory to plowing the plats. The dwarf milo on D3 was cultivated. Manuring of plats A5-13 and 17 was completed. Plats A6-1, 2, 7, 9, and 11 and A5-3 were plowed, and A5-17 was plowed and subsoiled.

The first picking of cotton in the thinning experiments on C3 and D3 was completed. Picking of cotton on the rotation experiments was started.

Messrs. Hastings and Meade spent a part of two days inspecting Durango and Acala cotton fields south of the station. Durango, when grown under irrigation, made a very satisfactory showing as compared with the other short and long staple cottons.

Belle Fourche.

The maximum temperature during the week ending September 6 was 97, minimum 56; no precipitation.

Winter wheat plats in Field A were seeded.

Irrigation of stubble plats in Field A was commenced.

All corn in the dry-land rotations was husked.

Alfalfa in Fields K, O and P was irrigated.

The time-of-breaking experiment in Field D was plowed.

Millet in Fields E and K was harvested.

The foundation for new seed house was commenced.

Scottsbluff.

During the week ending September 6 there was precipitation of 0.45 inch. This shower did a great deal of good to the newly seeded alfalfa and put the soil in good shape for the winter wheat.

Some of the early varieties of corn have been cut and seed selected from the same. Present indications are that the corn crop in the Valley will mature better than ever before. Much of it is

13 September, 1913.

FIELD NOTES.

Scottsbluff (continued).

hardening in good shape.

During the past two weeks there have been some heavy losses in the beet fields. Mr. Knorr has been called out to see damage done by the beet worm, and he states that in all his experience with sugar beets he has never seen such damage as has been done by the worms this year. As none of the farmers are equipped with spray pumps they have no means of combating the pest and must depend on the blackbirds for the destruction of the worms.

Fall plowing was started Wednesday. All of the stubble plats on Field K have been plowed and some of the other stubble on the general farm work.

Work was begun on a new hog house, but progress is slow because of the scarcity of carpenters.

San Antonio.

The maximum temperature during the week ending September 6 was 98, minimum 68. The total precipitation was 0.85 inch.

Plowing of corn stubble in the rotation experiments was continued and the following plats were plowed: A6-11, 13, 15, and 17, B5-1, 2, and 13. Plat B5-2 was manured.

After the rain the orchards, sorghum in rows on the rotation experiments, nursery, and fallow land were cultivated.

All the rotation plats which have been plowed this season were harrowed.

Plats B6-7, 9, 11, and 17 were double disked in preparation for seeding field peas and rye as winter green manure crops.

Picking of cotton was continued.

Mr. R. E. Blair arrived at the station on the 4th, enroute to Bard.

Messrs. Clarke and Johnson returned to the station from North Texas, and Messrs. Meade and McKeever left for Clarksville and greenville for cotton work.

20 September, 1913.

FIELD NOTES.

San Antonio.

The maximum temperature during the week ending September 13 was 101, minimum 60; greatest daily range 32. The week was one of cloudy weather and rain, the total precipitation being 4.27 inches. The highest precipitation for any 24 hour period was 2.12 inches, on the 10th.

The bad weather prevented field work the greater part of the week. This time was made use of in cleaning up the premises, in threshing head row oat selections, and in repairing machinery.

Plats B5, 13 and 15 and B6-1 were plowed when the weather permitted, and cotton picking was continued.

The recent wet weather has done much damage to unpicked cotton fields, much of the cotton falling to the ground.

Mr. G. A. Schattenberg visited the station on the 13th, and Mr. R. E. Blair left for Bard on the 11th.

Belle Fourche.

The maximum temperature during the week ending September 13 was 93, minimum 43; precipitation, 0.13 inch.

Irrigation of stubble plats in field A was completed during the week.

Plowing in field D was completed, and the plowing of dry land rotations in field B was continued.

Corn in field B rotations was cut and hauled in.

Sorghum in field G was cut and the plowing in this field was commenced.

Harvesting of alfalfa in field A was commenced.

Huntley.

During the week of September 6 alfalfa in fields K, AIII, and AIV was harvested.

Fall plowing of grain stubble in field M was completed. Two plats of sweet clover and two of rye were planted in field M-I.

20 September, 1913.

FIELD NOTES.

Yuma.

During the week of September 6 grain sorghum was harvested from fields D-22 and 24.

Alfalfa was harvested on C-27, 39, 40, and 42 to 45.

All trees in the seedling fig orchard having ripe figs have been tagged. The fig orchard has made a good growth, considering the severe freeze the past winter, and many trees are fruiting, but on very few trees are the figs maturing. Evidently most of the seedlings will require fertilizing. The orchard was cultivated to a dust mulch and will receive no further irrigation this season.

Deciduous orchard B-25 to 30 was disked and hoed and date lands A-18 to 21 were disked.

Irrigation ditches were disked and hoed.

Truckee-Carson.

During the week ending September 6 the maximum temperature was 91, minimum 49.

Plats E-5, 6, 7, 8, 11, and 12 were plowed.

The Turkey Red winter wheat grown on F-8 was threshed. A yield of 160 pounds was obtained from 0.347 acre, which is equivalent to 462 pounds per acre. The threshing was done by a hand-mand machine and a large percentage of the grain was lost.

Mr. F. H. Newell, Director of the Reclamation Service, visited the station on the 3rd.

Scottsbluff.

During the week of September 13 the early potatoes were dug and sold at 75¢ per cwt. loaded on cars.

Plowing under of alfalfa in fields C and G II was started, as was also irrigation of the young alfalfa in field D and oat stubble in BIII.

Messrs. Knorr and Holden left on the 9th for points in Colorado and Montana.

The maximum temperature during the week was 82, minimum 46.

20 September, 1913.

FIELD NOTES.

Huntley.

During the week of September 13 winter wheat was planted in Field M-I.

Alfalfa plats in Field K to be plowed this fall were crowned.

The third cutting of alfalfa on Fields K, AIII and AIV was hauled in, the yields being as follows:

Rotation number.	Plat number.	Date harvested.	Pounds per plat.	Tons per acre.
67 D	KII-1	9-3-13	685	1.37
67 E	KII-2	hogged	...	....
67 C	KII-6	9-3-13	740	1.48
61 D	KIII-1	do	820	1.64
61 E	KIII-2	do	625	1.25
61 C	KIII-6	do	655	1.31
60 D	KIII-7	do	830	1.66
60 E	KIII-8	do	740	1.48
60 C	KIII-12	do	685	1.37
40 C	KIV-1	do	625	1.25
40 B	KIV-4	do	540	1.28
42 C	KIV-7	do	700	1.40
44 B	KIV-14	do	620	1.24
8 cc	KIV-22	do	650	1.30
Plat Number				
AIII-1	(N.C)	9-5-13	750	1.50
AIII-2	(Early)	do	740	1.48
AIII-3	(Late)	do	740	1.48
AIII-4	(18" rows)	do	600	1.20
AIII-5	(N.C)	do	715	1.43
AIII-6	(Early)	do	770	1.54
AIII-7	(Late)	do	860	1.72
AIII-8	(18" rows)	do	595	1.19
AIII-9	(N.C)	do	665	1.33
AIII-10	(Early)	do	835	1.67
AIII-11	(Late)	do	860	1.72
AIII-12	(18" rows)	do	730	1.46
AIII-13	(N.C)	do	840	1.68

20 September, 1913.

FIELD NOTES.

Huntley (continued)

Plat Number	Date harvested	Pounds per plat.	Tons per acre.
AIV-1 (N.C)	9-5-13	775	1.45
AIV-2 (Early)	do	750	1.50
AIV-3 (Late)	do	735	1.47
AIV-4 (18" rows)	do	650	1.30
AIV-5 (N.C)	do	775	1.55
AIV-6 (Early)	do	805	1.61
AIV-7 (Late	do	830	1.66
AIV-8 (18" rows)	do	740	1.48
AIV-9 (N.C)	do	910	1.82
AIV-10 (Early)	do	880	1.76
AIV-11 (late)	do	945	1.89
AIV-12 (18" rows)	do	820	1.64
AIV-13 (N.C.)	do	835	1.67

Mr. Schattenberg left on Saturday to enter school at Bozeman.

27 September, 1913.

IRRIGATION IN THE PECOS VALLEY.

On his last trip west from Texas Mr. McLachlan visited the Pecos Valley to look into the conditions as to cotton production. His letter reporting on this trip is given herewith, because the information contained may be of interest to some of our people.

"As you already know, I spent parts of two days, September 7 and 8, in the Pecos irrigated country of Texas (west Texas). I reached Barstow, Texas, on the 7th and left there the afternoon of the 8th. I had conversation with parties interested in disposing of the land of the irrigation company at that point and spent several hours on the 8th driving with T. L. Patrick who has interests in the locality, and who has been running the cotton gin for the past two years. We visited a number of cotton fields.

The irrigation area in the Barstow locality is the largest in that immediate section. There are now about 8,000 acres being irrigated, but evidently not a sufficient water supply to do justice to all plantations. Some 4,000 acres are in alfalfa, and 2,000 in cotton. Alfalfa is in the ascendency at present but the extension of the alfalfa acreage is at present impossible because of the limited water supply. In fact, the only reason under present conditions for growing cotton appears to be that cotton can be grown on a much more limited supply of water than alfalfa and serves for a fill-in crop. They produce an average of from 5 to 6 tons of alfalfa which sells f.o.b. Barstow at from $11.50 to $15.00 per ton. This is very favorable especially as they have a freight rate of 18¢ to all Texas points. Their seed crops average well though from reports seed is a very precarious crop, due to some condition which they do not understand.

Their irrigation water is very alkaline, but they have been able to wash out some lands on which salt was white, and are now growing alfalfa on the reclaimed land.

27 September, 1913.

Irrigation in the Pecos Valley (continued)

The soil of this section is sand and gravelly sand, in the natural state with a dense sod or prairie grass and salt grass. When first put under these lands are claimed to produce very heavy crops of cotton but soon wear out. Even the alfalfa lands require fertilizing annually. What they use I was not able to determine.

Most of the cotton is now on old land and producing very poorly. On the 2,000 or so acres of cotton it is estimated that the yield will not exceed 800 bales.

The stand of cotton is generally poor due probably to leaf-cut from the cold nights of spring and early summer. Possibly the alkalinity of the water has something to do with their securing poor stands. I saw no field with anything approximating a full stand.

The best fields had about an 80% stand and were very heavily bolled, in fact, the plants were as heavily fruited as any I ever saw. The grower told me that he attributed the fruitfullness to his deep plowing which allowed all the water to permeate the soil and be utilized, and prevented water standing on the surface to occasion scald. The condition of this field reminded me of those encountered at Glendale, Cal., where extreme fruitfullness followed proper water conditions. I believe Lanquin cotton might find a home under such conditions as those at Barstow. The nights are cool all summer, it is claimed.

The stocks of cotton being grown are the most badly mixed of any cotton I ever saw. At some time or other a little long-staple Upland cotton has evidently been grown and from year to year the gin-run seed has been planted. Bolls of all sizes and fiber of all length and shortness between 7/8" and 1-3/16".

Cotton is also grown at Grand Falls (about 1,000 bales) and at Imperial (about 500 bales) at both places, I was given to understand, because they did not have sufficient water to grow alfalfa.

Much of the land in this region is sub-irrigated, as they call it, and an immense drainage system has been installed to take care of the ground water. Bad

Irrigation in the Pecos Valley (continued)

land has actually been reclaimed in a number of cases, but by men who have had to stay by it to pay themselves out.

There are now plans on foot to form an irrigation district and take over the irrigation system from the present company. Later to bond the district for a sufficient amount to construct a storage basin about 20 miles above their present heading in the river. This storage basin will make it possible to irrigate some 20,000 acres at the outside, and water it thoroughly.

I believe cotton will find a place in this section as a fill-in crop for use in renovating alfalfa fields. It hardly seems desirable to undertake any work with cotton there at present unless Lanquin or Durango be located with some cooperator. If desirable to do something of this sort to ascertain the effect of the peculiar climatic conditions on cotton, the expense of inspection would not be great as visits could readily be paid to the section on the way to and from the western cotton growing districts.

Enthusiasm of any sort is rather lacking in the Pecos irrigation country. I understand some pump irrigation systems, using wells, are being installed south of the town of Pecos.

(Signed) Argyle LcLachlan.

FIELD NOTES.

Truckee-Carson.

During the week ending September 13, the maximum temperature was 91, and the minimum temperature was 44.

Plots F7, 8, 27 and 28 were plowed.
Fields D and F were irrigated.
Japanese millet on S1 and Y5 was cut.

27 September, 1913.

FIELD NOTES.

Truckee-Carson (continued)

Bids were sent out for one minimum car of Gypsum, one minimum car of Drain tile, and one Commercial Sower to be used for spreading the Gypsum.

The tank house hill was seeded to grass varieties and Sand Vetch.

The roads about Fields D and F were freed from weeds and graded.

Mr. C. J. Blanchard and Mr. Murphy of the U. S. Reclamation Service visited the farm on the 11th.

Yuma.

During the week ending September 13th Milo was harvested from Field E-6 and 7, also grain from some of the grain sorghum varieties from borders D-22 and 24 was harvested. The latter two borders compose a part of the variety, successive planting block of grain sorghums. There is a great difference in time of maturity in these plantings but stalks from all are being removed as grain ripens to attempt to force another crop. Stalks from Milo on E-6 and 7 were similarly removed.

Hemp was harvested for seed on border D-17. Row alfalfa plantings C-42 and 43 was cultivated. Weeds and bermuda grass were hoed from date orchard A-16 to 21.

The Builder's Iron and Foundry Co., of Providence, R. I., makers of Venturi Meters, through the Reclamation people are installing, in one of the farm laterals, an experimental meter specially constructed for measuring water in an open ditch. Mr. Darby, representing the manufacturers, is installing the meter.

Mr. Blair returned from Washington and points in the middle west, Saturday.

27 September, 1913.

FIELD NOTES.

Huntley.

During the week ending September 20, the maximum temperature was 83°, and the minimum temperature was 29°.

During the week sugar beets in Field K were harvested and alfalfa from Fields B-II and B-III was hauled in. A very heavy wind on the 18th scattered the hay over the plats in this field so badly that it was impossible to haul the plats separately as was originally intended. Yields of sugar beets will be given later when returns of sugar analyses are received.

The hogs in the alfalfa pasturing experiment in Rotation 67 were taken off. The total gain for period of 39 days was 209 pounds, which at 8 cents would amount to $16.72, deducting the value of the corn fed, 9.9 bushels at 90 cents per bushel, would leave $7.81 per plat, or $31.24 per acre for the alfalfa.

Hog No.	Breed	Sex	WEIGHT					GAIN	
			8/7	8/17	8/26	9/6	9/17	Total	per day.
1	Poland China	Barrow	49	53	59	64	69	20	.51
2	"	"	50	53	57	60	66	16	.41
3	"	"	53	58	61	66	72	19	.48
4	"	Gelt	53	58	63	67	74	21	.53
5	"	"	51	56	62	66	72	21	.53
6	"	"	36	39	42	47	53	17	.43
7	Duroc & Chester White	Barrow		64	65	70	75	9	.3
8	Duroc	"		71	74	81	87	16	.53
9	"	"		71	76	82	86	15	.50
10	"	"		73	76	84	90	17	.56
11	"	Gelt		63	68	73	85	22	.73
12	"	"		61	65	72	77	16	.53
							Total	209	

27 September, 1913.

FIELD NOTES.

Huntley (continued)

9.9 bushels of corn was fed at 90¢ per bushel - $8.91.
209 pounds gain at 8¢ per pound - $16.72
Gain per plat $7.81.
Gain per acre $31.24 for third crop of hay.

Owing to the scarcity of hogs in this locality but little selection was possible in obtaining hogs for this test. On August 7, five Poland China hogs, three barrows and two gelts, farrowed April 26, and one gelt farrowed May 28th, were placed on 1/4 acre of alfalfa, which was divided into two equal lots. These would scarcely keep half the plat eaten down so on August 17 five Durocs, three barrows and two gelts, and one chester White Duroc cross, all farrowed about April 15, were added. The alfalfa by this time had gained considerable growth above good pasturage, and so was clipped once. After September 1, the alfalfa seemed to make slower growth and from then on to the end of the test, there was not sufficient pasture for the number of hogs. The hogs were pastured alternate weeks on each half. As soon as the hogs were removed from one portion it was irrigated. Until August 28 two pounds of corn on the ear to 100 pounds live weight was fed. After this because of close pasture the corn was increased to two pounds of shelled corn to 100 pounds live weight. The barrows in both the Poland China and Duroc lots were castrated a few days before being put on the test, which may account for the lower average gain, than was made by the gelts. The Poland Chinas and the Durocs, aside from the Duroc Chester White cross, were said to be "full blood" and were fairly good types of their respective breed. The Durocs were perhaps slightly more of a bacon type than is usually bred. Under these rather adverse conditions, it is thought the results obtained here are rather conservative.

27 September, 1913.

FIELD NOTES.

Scottsbluff.

On September 20 the first frost occurred. This frost was severe enough to kill all of the garden truck, sorghum, etc.

On the 18th the cutting of the third crop of alfalfa was begun. This crop will be very heavy.

During the week much of the time was devoted to fall plowing and irrigating. A small gang was at work harvesting potatoes.

Farm labor is very scarce, and there are three men less than the usual number at work at the farm. It is impossible to secure additional help at this season.

Hog colera is reported on various parts of the Project, coming so late in the year that it is hoped that the cold weather will check it before it makes too much headway.

During the week ending September 20 corn was cut on Field K.

San Antonio.

During the week ending September 20, the maximum temperature was 90°, and the minimum temperature was 55°; the greatest daily range was 28°.

Total precipitation for the week was .42 inch; this occurred on three days. After the rains of the previous week, the orchards and fallow plats were cultivated, and recently plowed plats were harrowed.

Plats B6-5 and A4-8 were plowed, and B6-3 was plowed and subsoiled.

The milo stubble on B4 was cut to put the land in readiness for plowing. Chinese corn on AB8 was harvested. When the weather permitted, cotton picking was continued.

Messrs. Meade and McKeever returned to the station on the 18th, to complete the cotton work for the season.

27 September, 1913.

FIELD NOTES.

Belle Fourche.

During the week ending September 20, the maximum temperature was 80°, minimum temperature 33°, and the precipitation 1.94 inches.

The rain did considerable damage to the third crop of alfalfa, and no field work was done the fore part of the week.

The winter wheat varieties and nursery was planted in G IX.

The foundation for the seed house was completed and the carpenter work commenced.

The corn in rotation 65 was fenced and 8 hogs of an average weight of 51 pounds were turned into same. These hogs were previously pastured in alfalfa in the same rotation. For the twenty days pastured a gain of 96 pounds was made, during which time 335 pounds of ground feed was consumed. Market price for hogs at Newell is 7¢; cost of feed 1¢ per pound. At this rate the alfalfa produced $3.35 for the quarter acre, or at the rate of $13.40 per acre for 20 days pasture.

Following is the report of the yield of grains on the irrigated rotations:

FIELD A.
(Oats)

Series.	Plat No.	Rotation No.	Yield-Bu.
I	8	42	26.1
	9	60	35.0
	16	30	46.8
	19	31	51.0
	22	16	44.8
	31	22	45.0
	33	23	44.4
	34	24	44.6
	36	25	33.8
	40	27	39.1
	43	28	31.9
	44	(Con. cropping)	24.1

27 September, 1913.

FIELD NOTES.

Belle Fourche (continued).

Series.	Plat No.	Rotation No.	Yield-Bus.
II	7	62	28.5
	13	61	39.7
	19	48	54.0
III	10	32	30.5
	14	65	28.9
	19	44	54.5
		Wheat	
I	25	18	31.3
	43	28	13.7
	46	(Con. cropping)	15.5
	50	(Con. cropping)	18.4 & return straw
	22	48	20.6
	23	(Vol.sp.wheat)	14.7
		Winter wheat	
I	48	(Con. cropping)	7.7
II	28	66	15.0
		Barley	
II	26	66	14.8
	47	(Con. cropping)	14.0
		Flax	
I	52	(Con. cropping)	6.1
II	25	66	18.6
III	13	65	15.5

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27 September, 1913.

TRUCKEE-CARSON FAIR.

This office is in receipt of a 40-page Premium List and Program for the Sixth Annual Fair at Fallon, Nev., to be held for the full week of September 29, 1913. Mr. F. B. Headley is President of the Fair Association. This is the first time this Association has ventured on a six-day fair, and this event indicates the agricultural progress of the Truckee-Carson Project.

FARRELL-JENSON.

Cards have been received announcing the marriage of Mr. F. D. Farrell, of this office, and Miss Mildred Jenson, of Brigham City, Utah, September 26, 1913.

PERSONAL.

Mr. L. A. Richardson, of Logan, Utah, has been appointed Scientific Assistant in Agronomy in this office.

Mr. S. H. Hastings arrived at Washington on the 25th and will be angaged in work at the office during the next two months.

Mr. Farrell returned to Washington on the 27th and resumed his duties in the office after a two months' trip in the field.

4 October, 1913.

COOPERATION WITH THE BUREAU OF ANIMAL INDUSTRY.

It has been known for some time that the work of the field stations maintained by the offices of Western Irrigation Agriculture and Dry Land Agriculture could be made more efficient if the investigations of crop production problems were supplemented by experiments with live stock. It is clear that our work in crop production is incomplete, in so far as the farmers of the West are concerned, unless some attention is paid to questions of crop disposal and crop utilization. Live stock work on most of our field stations has been impracticable in the past because of the lack of the necessary arrangements with the Bureau of Animal Industry.

Steps have recently been taken looking to the establishment of some such cooperative relationships between the Bureaus of Plant and Animal Industry as will facilitate the prosecution of investigations of live stock problems in connection with the utilization of crops produced on the irrigated and non-irrigated lands of the West.

The following memoranda are self-explanatory and indicate the nature and extent of the developments so far made in connection with this matter. As soon as practicable after the committee's plans are completed and approved they will be published in the WEEKLY BULLETIN.

"MEMORANDUM FOR MR. TAYLOR:

Sept. 22, 1913.

Last spring a petition was received by the Office of Dry Land Agriculture from the farmers and business men in the vicinity of Ardmore, S. Dak., asking for the establishment of a dairy farm in connection with the field station at that place. This petition was forwarded to Dr. B. T. Galloway, Chief of the Bureau of Plant Industry. He forwarded it to the Bureau of Animal Industry, with a letter of which the following is a copy:

4 October, 1913.

Cooperation with Bureau Animal Industry (continued).

"Washington, Mar. 7, 1913.

Dr. A. D. Melvin,
Chief, Bureau of Animal Industry.

Dear Doctor Melvin:

I enclose herewith a petition for the establishment of a dairy farm at Ardmore, South Dakota, of which I would ask your consideration. We have a dry-land station at Ardmore and have realized for some time that work along dairy lines would be a valuable adjunct to what we are endeavoring to do for the people of the region. If it is at all practicable for you to undertake any work such as is indicated by the petition, I would suggest that Mr. Rawl confer with Mr. E. C. Chilcott, who has charge of our work at Ardmore.

Very sincerely,
(Signed) B. T. GALLOWAY,
Chief of Bureau."

Acting upon the suggestions contained in this letter, several conferences have been held between Messrs. Rawl and Chilcott, and a satisfactory understanding has been established for cooperative work at the Ardmore station. And from these conferences it appears desirable from the standpoint of both Bureaus to inaugurate some cooperative work both in dairying and in meat production, not only at Ardmore but at several other field stations of the Bureau of Plant Industry, operated through the offices of Dry Land Agriculture and Western Irrigation Agriculture. The reasons for the need of such cooperative work are briefly as follows:

For some years the Bureau of Plant Industry has been engaged, through the offices of Dry Land Agriculture and Western Irrigation Agriculture, in the investigation of problems in connection with the production of crops on semi-arid and irrigated lands in the western United States. In connection

Cooperation with Bureau Animal Industry (continued).

with these investigations something over twenty field stations have been established by these two offices. Twelve of these stations occupy farms of 100 acres or more in size, on which are conducted experiments in testing and breeding of grains, forage crops, and fruits, and also experiments in crop rotations and tillage methods.

While these field stations are primarily intended for the investigation of agricultural problems, they necessarily serve also to a certain extent as demonstrational and educational centers for the benefit of local farmers.

It has become increasingly obvious that, to serve best the purposes for which they were established, steps should be taken to provide for conducting on these field stations certain investigations and demonstrations with animal industries as well as with plant industries. Speaking generally, permanent prosperous agriculture in the section of the country in which these stations are located must include animal production as well as the production of crops. This is essential not only because of existing economic conditions, but also for the maintenance of the productivity of these lands. It is not economically feasible for farmers in the western United States to devote their attention exclusively to the production of plant products. They must, on the other hand, engage extensively in animal production and use plant products largely, if not chiefly, as a basis for animal production.

This being the case, it is apparent that many of our field stations can best serve the purpose for which they were intended if provision can be made to carry on them experiments and demonstrations in animal industries as well as in the plant industries.

We would therefore respectfully suggest that a joint committee representing the field station work of the Bureau of Plant Industry and the Dairy and Meat Production work of the Bureau of Animal Industry be appointed to formulate a general plan of cooperation between these two Bureaus, and that such committee report to the Secretary in time to enable

4 October, 1913.

Cooperation with Bureau Animal Industry (continued).

him to provide for such cooperative work in the estimates submitted to Congress for the fiscal year 1915, if it meets with his approval.

(Signed) Office of Western Irrigation Agriculture.
C. S. Scofield,
Agriculturist in Charge.

Office of Dry Land Agriculture,
E. C. Chilcott,
Agriculturist in Charge.

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September 22, 1913.

MEMORANDUM FOR THE ASSISTANT SECRETARY.

Dear Doctor Galloway:

For several months past, as you know, there has been an informal consideration by Messrs. Rawl, of the Bureau of Animal Industry, and Chilcott, of this Bureau, of the advisability of undertaking some cooperative work in dairying in connection with our Ardmore, South Dakota, field station. This is the outgrowth of a petition from the community there that such work be done. Mr. Rawl has recently visited the Ardmore station and he and Mr. Chilcott have reached a satisfactory understanding with regard to methods of establishing such work there.

Their consideration of this Ardmore question brings clearly to light the fact that there is need of work of this character at other points where this Bureau is maintaining field stations, especially those maintained in connection with the Offices of Dry Land Agriculture and Western Irrigation Agriculture.

It has become increasingly apparent that work of this character is needed before there can be satisfactory progress in the direction of developing

4 October, 1913.

Cooperation with Bureau Animal Industry (continued).

a well balanced and permanent agriculture adapted to the peculiar conditions prevailing in the arid and semi-arid West. In some localities the profitable marketing of the crops must apparently be accomplished through their conversion into dairy or meat products. In any case the inclusioon of live stock in the agriculture will be essential to the maintenance of productivity of lands.

I am enclosing herewith a memorandum from Messrs. Chilcott and Scofield on this subject, in which the suggestion is made that a joint committee representing the field station work of this Bureau and the dairy and meat production work of the Bureau of Animal Industry be appointed to consider the general question with a view to working out an effective plan of cooperation between these Bureaus to meet this need, this with a view, if possible, to giving consideration to the matter in connection with the estimates for the fiscal year 1915.

The proposal has my hearty approval, and if you approve, I would suggest Messrs. Chilcott and Scofield as members of such committee from this Bureau.

Yours very truly,
(Signed) W. A. TAYLOR,
Chief of Bureau.

Approved:

Assistant Secretary.

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September 26, 1913.

MEMORANDUM FOR CHIEF OF BUREAU OF ANIMAL INDUSTRY AND CHIEF OF THE BUREAU OF PLANT INDUSTRY.

Gentlemen:

I have been considering the matter of a committee in connection with the carrying on of cooperative work in dairying and animal husbandry on

4 October, 1913.

Cooperation with Bureau Animal Industry (continued).

the various experiment farms which are now being conducted by the Bureau of Plant Industry, and have approved the recommendations which have been submitted by Mr. W. A. Taylor under date of September 22, copy of which is enclosed.

The matter of funds for this work will be considered when the estimates for the next fiscal year are before me. In order to handle this cooperative work I will appoint a committee consisting of Prof. E. C. Chilcott, Mr. B. H. Rawl, Mr. George R. Rommel, and Mr. C. S. Scofield, to consider the whole question of future cooperative work between the Bureau of Animal Industry and the Bureau of Plant Industry on various dry-land and other experiment farms operated by the Bureau of Plant Industry.

Very truly yours,
(Signed) B. T. GALLOWAY,
Assistant Secretary.

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September 27, 1913.

Prof. E. C. Chilcott,
Bureau of Plant Industry,
Department of Agriculture.

Dear Professor Chilcott:

I shall be obliged if you will act as chairman of a permanent committee, with Mr. B. H. Rawl, Mr. Geo. R. Rommel, and Mr. C. S. Scofield, as members, to consider the whole question of the development of work in animal husbandry and dairying on the various farms now operated by the Bureau of Plant Industry.

It is believed that the value of these farms cannot be fully utilized until the crop work is coordinated and connected with animal production and dairying. I have before me estimates for the inauguration of work at the Ardmore dry-land experiment farm and will give this matter consideration in connection with the regular estimates.

4 October, 1913.

Cooperation with Bureau Animal Industry (continued).

The duty of the committee will be to develop plans and procedure for carrying on cooperative work at the various stations as fast as the funds will permit.

Very truly yours,
(Signed) B. T. GALLOWAY,
Assistant Secretary.

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FIELD NOTES.

Truckee-Carson.

During the week ending September 20 the maximum temperature was 95°, minimum 44°; rainfall, .03.

The work of building the cement foundation for the new Dormitory was begun.

The leveling of Field B was continued.

Plats F-7 & 8 were leveled preparatory to seeding winter emmer, rye, and wheat.

Belle Fourche.

The maximum temperature during the week ending September 27 was 72, minimum 29; precipitation .31.

In the irrigated rotations the third cutting of alfalfa was hauled in and corn was harvested and shocked.

On the 26th the hogs pastured on rotation 65, A-III-18, were weighed, and the gain for the plat was 140 pounds. The market price of hogs at Newell was 7 cents, and at this rate the corn was worth $39.20 an acre. Eight hogs; average weight 51 lbs. at the beginning of the experiment; time pastured 11 days.

4 October, 1913.

FIELD NOTES.

Belle Fourche (continued).

The winter wheat and rye were seeded in the dry-land rotations, and the corn was also hauled in.

The carpentry work on the seed house has been started.

Mr. Salmon has resigned from the service and accepted a position with the Kansas Agricultural College at Manhattan, Kans.

Dr. O. C. Townsend visited the station on the 27th.

Umatilla.

During the week of September 13 the maximum temperature was 89°, minimum 36°.

Experiment Station Day, September 9, drew a large crowd, a total of 212 persons being present. Among those attending were people from the Inland Irrigation Project at Stanfield, the Western Land Project west of Hermiston, and the Oregon Land and Water Company Project at Irrigon. Dr. James Withycombe, Director of the Oregon Experiment Station addressed the visitors, giving them a few words of encouragement and making suggestions to benefit them in their pioneer work. The work of the Experiment Farm and its relation to the problems of the farmers was outlined by the Superintendent, after which the people were taken over the farm and all the principal experiments were explained.

Mr. Byron Hunter, of the office of Farm Management, and Mr. S. O. Jayne, of the office of Irrigation Investigations, visited the Farm during the week and spent several days studying the soil conditions on the project and investigating the work that has been accomplished by the settlers.

During the week ending September 20 the maximum temperature was 93°, minimum 36°.

Fields D3 and B2c were prepared and seeded to alfalfa.

Field D5 and parts of A2, C1, C2, C3, and 4 were seeded to vetch and rye.

4 October, 1913.

FIELD NOTES.

Umatilla (continued).

Field A3a was seeded to vetch, being divided into four plats, which were given 15, 30, 45, and 60 pounds of seed, respectively, to determine the smallest satisfactory amount of Vicia villosa seed to use on sandy land.

The above fields were irrigated before seeding and after.

Fields B2c and D3 were covered with straw to prevent erosion.

Dr. McCool, of the Agronomy Department of the Oregon Agricultural College, visited the station while working out a soil survey of the project.

Dr. H. W. Walenweber, of the office of Cotton and Truck Disease and Sugar Crop Investigations, visited the station and found wilt diseases affecting cowpeas, eggplant, and tomatoes.

Yuma.

During the week ending September 20 the maximum temperature was 109°, minimum 63°; greatest daily range, 45°

Alfalfa from borders E-1 to 6 and C6 & 7 was harvested.

Hemp seed from border D-17 was threshed out by hand.

Pruning of seedling fig orchard C-8 to 17 was begun.

The installation of the Venturi meter was completed during the week and a test run was made Wednesday. The meter installed is one rated to carry 10 second feet of water in an open ditch, but is not wholly successful under the present arrangement, To carry 10 second feet there has proved to be a loss of head of 12 inches, which is the greatest objection to the effectiveness of the instrument. When the laterals are held to irrigating higher borders with a loss of head of not to exceed 4 inches at the meter, it will handle but 6 to 7 second feet.

4 October, 1913.

FIELD NOTES.

Huntley:

During the week ending Spetember 27 the maximum temperature was 82°, minimum 27°; precipitation 1.20 inches.

On account of rain no outside work was possible during the fore part of the week.

During the latter part of the week corn in Field K was harvested and the plowing of the stubble ground was commenced. The season has been unusually favorable to corn and nearly all varieties tried this year have matured fairly well.

Yields of Sugar Beets.

(Field K)

Rotation number.	Plat number.	Pounds per plat.	Tons per acre.	% Sugar.	% Tops.	Stand per acre.	Weight per beet. (ounces)
67 B	KII-5	8402	16.8	15.0	23.5	25968	20.6
61 B	KIII-5	7881	15.76	13.6	24.0	26112	19.2
60 B	KIII-11	5814	11.63	16.2	35.3	28256	13.1
31 B	KIII-14	7663	15.32	17.2	32.8	29568	16.5
40 A	KIV-3	6673	13.34	17.7	32.3	24640	17.3
42 A	KIV-9	7192	14.38	15.1	31.9	23728	19.4
30 B	KIV-16	5699	11.39	15.8	30.7	25312	14.4
32 B	KIV-19	5631	11.26	16.4	30.8	26592	13.4
18 A	KV-3	4729	9.46	15.0	33.0	22080	13.6
20 A	KV-5	6286	12.57	13.8	33.9	27424	14.6
22 A	KV-7	7611	15.22	15.7	32.3	25136	19.4
21 A	KV-13	6664	13.33	14.9	31.6	29368	14.4
23 A	KV-15	6681	13.36	16.1	16.1	27392	15.5
2 CC	KV-22	4628	9.25	16.2	28.6	25888	10.4

NOTICE.

Those of the field staff who contemplate making a trip to Washington during the coming winter should send in promptly full information concerning their travel, so that authorizations may be properly drawn and gotten out in time. This information should comprise the proposed itineraries, stops, purposes of stops, leave to be taken, date of leaving station, etc.

11 October, 1913.

EXPERIMENTS IN ALKALI SOIL RECLAMATION ON SERIES Y, TRUCKEE-CARSON EXPERIMENT FARM.

Mr. Headley has submitted to the Washington Office plans for a set of experiments to be conducted on Series "Y" at the Truckee-Carson Experiment Farm, beginning this fall. This series contains 24 plats of about one-half acre each and is representative of the most refractory soils on the Truckee-Carson Project. The difficulty of reclamation is due to the presence of harmful quantities of alkali salts which are not readily removed by washing. The large quantities of carbonates present so puddle the soil that the penetration of water is extremely slow, and the removal of these and other salts by irrigation appears to be impossible unless some special treatment is applied for the purpose of neutralizing the carbonates or otherwise increasing the penetrability of the soil. A further difficulty is presented by the existence of a water table near the surface of the ground. Permanent removal of the alkali salts and successful crop production will not be possible until this water table is lowered.

Ever since the establishment of the experiment farm, in 1906, Series "Y" has been regarded as the worst part of the tract. The major portion of the large volume of detailed technical work which has been done on the farm has been on this series; and so far every attempt at its reclamation has failed. A general idea of the quantities of salts present in the soil on Series "Y" is conveyed by the following: Between June 17 and August 12, 1911, 152 soil samples were taken from this field. Of these samples, 71 contained more than 0.20 per cent of total soluble salts; 50, more than 0.30 per cent; 35, more than 0.40 per cent; and 20 contained in excess of 0.50 per cent. Mr. Headley has found that a varying, but usually large, portion of these salts are carbonates. The average depth to ground water on the field during the season of 1913 is indicated by the following figures, which state the average of six wells in each instance: May 13, 3.84 feet; July 15, 4.44 feet; and September 16, 4.70 feet.

Alkali Soil Reclamation (continued).

In the experiments outlined below it is assumed that the land may be considered reclaimed when a successful stand of alfalfa is obtained. For this reason the planting of alfalfa is the final phase of each treatment; and the behavior of the alfalfa crop will be used as a measure of the efficacy of the treatment in each instance. It will be noted that the treatments increase in simplicity from "A" to "G". The first, "A", is the one which Mr. Headley considers most likely to succeed, his belief being based on the results obtained in previous field tests at the farm and in the pot experiments recently carried on in the greenhouse. In all the other treatments, "B" to "G", one or more of the units in "A" are omitted, until in the last, "G", no special treatment will be applied. Treatments "A" and "G" will be tried in quadruplicate and the others in duplicate. The outline follows:

Proposed Experiments on Series "Y".

Plat numbers.		Treatment.
1, 3, 13 and 15	A	Tile drain through middle of plat. Manure, 25 tons per acre, applied in early spring of 1914. Gypsum, 2 tons per acre, applied in early spring of 1914. Plow. Gypsum, 2 tons per acre, applied after plowing. Sweet clover, planted in spring of 1914. Sweet clover, plowed under in June, 1915. Alfalfa, planted after plowing, 1915.
4 and 6	B	Tile drain through middle of plat. Manure, 25 tons per acre, applied in early spring of 1914. Gypsum, 2 tons per acre, applied in early spring of 1914. Plow. Gypsum, 2 tons per acre, applied after plowing. Alfalfa, planted in spring of 1914.

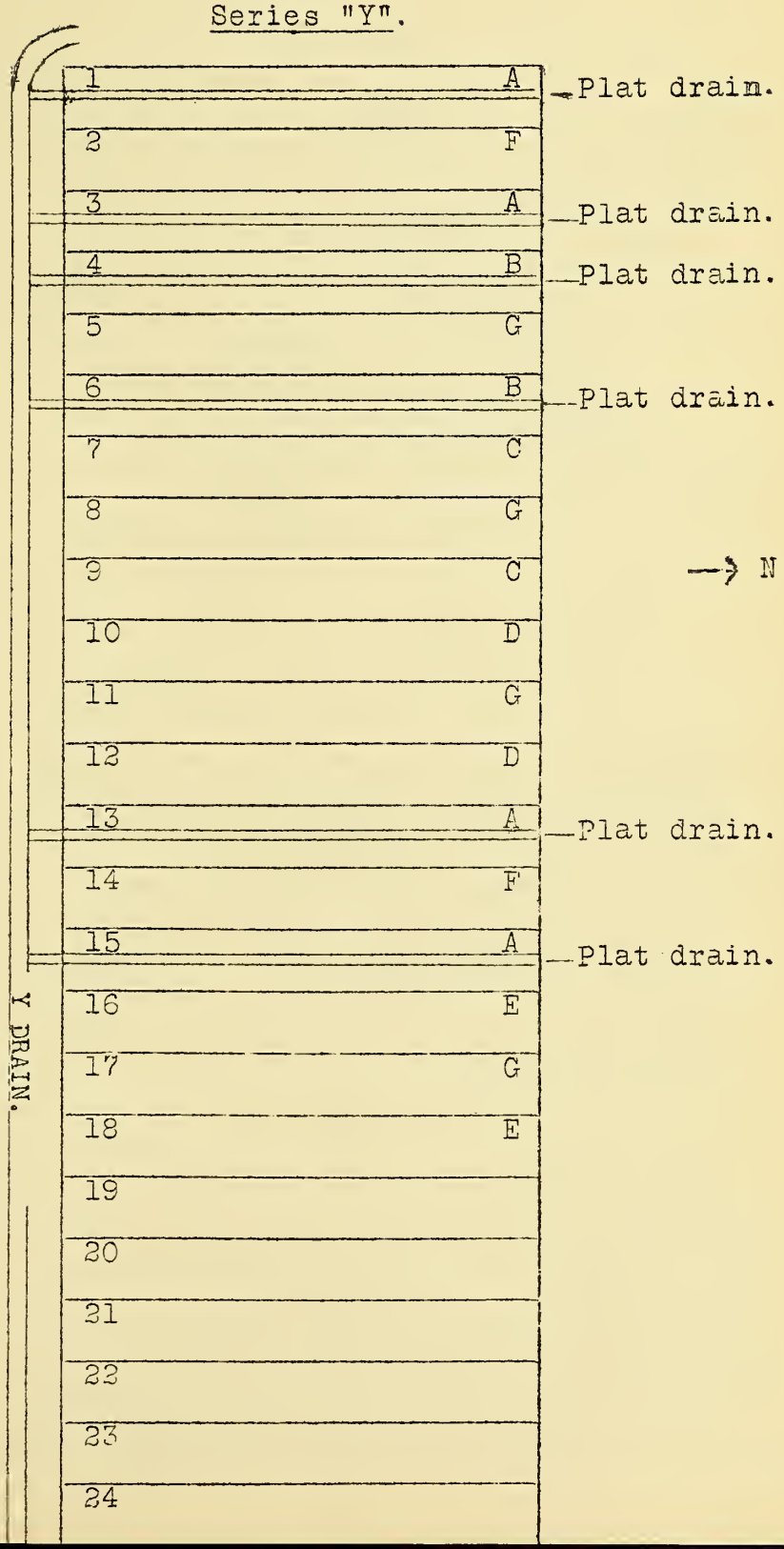
11 October, 1913.

Alkali Soil Reclamation (continued).

Plat numbers.		Treatment.
7 and 9	C	Manure, 25 tons per acre, applied in early spring of 1914. Gypsum, 2 tons per acre, applied in early spring of 1914. Plow. Gypsum, 2 tons per acre, applied after plowing. Alfalfa, planted in spring of 1914.
10 & 12	D	Gypsum, 2 tons per acre, applied in early spring of 1914. Plow. Gypsum, 2 tons per acre, applied after plowing. Alfalfa, planted after plowing in spring of 1914.
16 & 18	E	Plow in early spring of 1914. Acidulate with sulphuric acid in irrigation water, at a rate calculated to neutralize the carbonates present in the upper two feet of soil, the carbonate content being determined by analysis before irrigation. Alfalfa, planted after acidulation, 1914.
2 & 14	F	Plow in early spring of 1914. Sweet clover, planted in spring of 1914. Sweet clover, plowed under in June, 1915. Alfalfa, planted after plowing, 1915.
5, 8, 11 and 17	G	Plow in early spring of 1914. Alfalfa, planted after plowing, 1914.

The outline of the proposed experiments is shown diagramatically herewith. The numbers of the plats on the left and the treatments to be applied are indicated by the letters on the right.

Series "Y".


1 A
Plat drain.
2 F
3 A
Plat drain.
4 B
Plat drain.
5 G
6 B
Plat drain.
7 C
8 G
9 C
N
10 D
11 G
12 D
13 A
Plat drain.
14 F
15 A
Plat drain.
16 E
17 G
18 E
19
20
21
22
23
24
Y DRAIN.

Alkali Soil Reclamation (continued).

Pot Experiments.

Mr. Headley plans also to repeat the experiments recently conducted in soil cylinders in the greenhouse. These tests employ sulphuric acid and varying quantities of gypsum, the effects of the treatment on the penetrability of the soil being noted in each case. The ten cylinders of soil are treated as follows:

Cylinder Numbers.	Treatment.
1 and 2	Control.
3 and 4	Gypsum, 1 ton per acre.
5 and 6	Gypsum, 2 tons per acre.
7 and 8	Gypsum, 4 tons per acre.
9 and 10	Sulphuric acid, at a rate calculated to neutralize all carbonates.

SEED AND PLANT DISTRIBUTION FROM FIELD STATIONS.

During the past two or three years there has been a decided increase in the activity of the field stations maintained by this office in connection with the distribution of seeds and plants among the farmers in the districts where the field stations are located. The increasing magnitude of this activity has been particularly noticeable during the present season. A large number of fields, gardens, and trees planted with seed or plants from the field stations and showing unusually good condition have been observed. This is one of the convincing evidences of the benefits which the farmers are receiving from our experiment farms.

It is now desired that some measure of the extent of these activities and of their resulting benefits be obtained. For this purpose it is suggested that each farm superintendent secure and submit to the Washington office as complete information as possible relative to seed and plant distributions made from his farm during 1913, and, in the case of fall-planted seed or plants, during 1912 also. For convenience in assembling and tabulating this information, it is desired that the form given herewith be used in all cases.

11 October, 1913.

_____ Experiment Farm.

Record of Seed and Plant Distribution, 1913.

Name of farmer .....

Address .....

Crop.....

Variety .....

Method of distribution (sale, gift, exchange)

.....

Quantity of seed or number of plants.....

Acreage planted.....

Yield per acre .....

Other varieties of same crop ("Yes" or "No").....

Yield, per acre, of other varieties.....

Remarks (include comments of farmer and of superintendent, particularly as to comparative value of new crop or variety).

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.....

11 October, 1913.

Seed and Plant Distribution (continued).

A separate sheet like the foregoing should be used for each variety distributed to each farmer. In cases where a farmer has received two varieties of seed this year, two sheets should be used. The yields of the annual crops should be given whenever possible; and, in the case of perennial crops, a statement should be made relative to the vigor, growth and general behavior of the plants during the past season. It is specially desirable that comparative figures be obtained, where possible, relating to the performance of the seed or plants distributed and that of any other varieties of the same crop under comparable conditions.

Under "Remarks" statements should be made as to the comparative values of the distributed material, and as to any special characteristic or point of behavior of the crop. It is not sufficient that the report show that one strain of seed did "better" or "worse" than another—wherever possible the reason for the difference should be indicated. For instance, one strain or variety of oats did better than another because it ripened earlier or more uniformly, was less weedy, lodged less, shattered less, yielded more or better grain, etc., or because of two or more of these reasons; or it was inferior because it lacked one or more of these desirable characteristics.

Any information which the superintendent may wish to furnish in addition to that called for in the blank form will be appreciated.

It is requested that each farm superintendent advise the Washington office as soon as possible relative to the number of sheets required, so that they can be prepared and mailed without delay.

11 October, 1913.

IOWA BULLETIN ON HOGGING CORN.

Under the title "Hogging-Down Corn—A Successful Practice" the Iowa station has recently issued a bulletin (No. 143) which will interest the field men in this office.

The bulletin contains 53 pages, and discusses results obtained with hogging corn by the Iowa station and some 200 Iowa farmers, the principal points covered being: Extent of the practice; supplementary crops and feeds and their relative merits; comparisons of hogging and other methods, including costs and profits; kind of hogs used; size of field; carrying capacity of corn fields; fencing; maturity of corn to be hogged; duration of pasturing period; effects of hogging on the hogs and on the soil, and the advantages and disadvantages of hogging.

The bulletin can be obtained by application to the Director, Iowa Experiment Station, Ames, Iowa.

FIELD NOTES.

Scottsbluff.

During the week ending September 27 the third cutting of alfalfa was made. The cutting was lighter than was expected.

All of the early potatoes and the varieties have been harvested and work started on the potatoes on the irrigated rotations.

One man was put to irrigating and it was hoped to get over the winter wheat and the late seeding of the grasses before the water was taken out of the ditch.

Mr. Townsend, of Garden City, was at the farm testing the sugar beets.

If sufficient help could be obtained it was expected to start beet hauling the coming week.

Although the temperature fell as low as 24° one night, the alfalfa that was not cut at that time was not damaged.

11 October, 1913.

FIELD NOTES.

Scottsbluff.

During the week of October 4 digging of potatoes was completed and the digging of the sugar beets begun. The beet yields seem to be better than expected and all indications point to very good yields.

The dry-land corn is being shucked, and it promises a fair yield.

Belle Fourche.

The maximum temperature during the week of October 4 was 80°, minimum 38°; precipitation, 1.36 inch.

Alfalfa on O and P has been cut and put into shock; also alfalfa in time-and-method-of-seeding in A.

Variety corn under irrigation has been husked and weighed.

Two men have been working on the seed house all week.

The plowing in O and P has been continued.

The last rain will delay field operations for several days, especially digging of potatoes and sugar beets.

Umatilla.

The maximum temperature during the week of September 27 was 82°, minimum 31°.

The principal work of the week was irrigating and sowing vetch in various fields.

The corn was weighed from field A4, fertilizer plats.

The alfalfa sown in field D3 has all been destroyed by the wind, in spite of the fact that a heavy covering of straw was applied to the land after seeding.

11 October, 1913.

FIELD NOTES.

San Antonio.

The maximum temperature for the week ending September 27 was 89, minimum 46, and greatest daily range 35. The total precipitation was 1.67 inches.

Stacking of sorghum hay was under way when a rain of 1.3 inches came on Wednesday, stopping all field work. The first picking of cotton on the rotation plats was completed. The second picking will be very light. Corn varieties on C4 were harvested. The yield will be reported later.

The remainder of the time was utilized in working on the grounds, grinding feed, repairing equipment, etc.

Truckee-Carson.

The maximum temperature for the week ending September 27 was 84, minimum 27.

The potato, onion, corn, sorghum and broom corn varieties were harvested.

The cement foundation for the new dormitory was practically completed.

Several loads of manure were hauled from Fallon for use on the gardens and in the greenhouse.

COMPARATIVE WEATHER RECORDS FOR SEPTEMBER

	1913	1912	Average of All records.
Maximum temperature	95.00	90.00	95.00
Minimum temperature	27.00	29.00	26.00
Mean Temperature	64.50	58.20	60.54
Rainfall	0.03	0.43	0.34
Wind Velocity	2.44	3.57	3.67
Evaporation	7.10	6.07	6.06
Days Clear	23.00	22.00	20.20
Days Cloudy	11.00	5.00	5.00
Days party Cloudy	6.00	3.00.	4.80

11 October, 1913.

FIELD NOTES.

Yuma.

During the week ending September 27, the meterological report showed a maximum temperature of 107, minimum of 48, and greatest daily range of 40.

Many of the seedling hybrid figs on the "C" orchard series are putting on fruit this season although much is falling from lack of pollination.

Messrs. F. L. Sellew, Project Engineer at Yuma, and D. W. Murphy, Engineer in charge of drainage, visited the farm Friday.

Alfalfa from borders C-28 and D-27 was harvested, also, Tunis grass from border D-38.

During the week ending September 27 the bulk of the labor was directed to cotton picking and hoeing of weeds along roads and ditch system. Egyptian and Durango cotton are both opening rapidly, requiring extra labor for picking. Egyptian cotton picking in the surrounding valley is on in full force in the earliest plantings while the late plantings are not yet opening bolls. The scarcity of labor to get cotton harvested is not as noticeable as reported in previous seasons although the acreage is small. Indians and Mexicans along with a few whites and negroes are being employed. Two and one-half cents per pound is being paid for picking.

Fruit is ripening on the pomegranates, Field C-18. Of the seedling lot considerable determination of quality will be possible as to valuable and worthless sorts. All pomegranates have developed a fair crop of fruit this season. The fungus disease of the fruit appearing in past seasons is present, but not generally abundant.

18 October, 1913.

PROGRESS IN THE RECLAMATION OF THE WORDEN TRACT.

(Huntley Project)

One of the important features of the work of this office during the year 1913 is the results obtained on the Worden Tract, which is located on the Huntley Project. This tract, containing 40 acres, is situated near the town of Worden, about four miles east of the Huntley Experiment Farm, and in the center of an area where the soil is so heavily impregnated with alkali salts that crop production has in the past been uniformly unsuccessful. The soil on this area is an impervious clay to a depth of about 6 feet, and this is underlain with a stratum of porous gravel. The impervious character of the surface soil has prevented leaching by the rains and resulted in the accumulation of such quantities of salts as are not tolerated by most crop plants.

Operations have been conducted on the Worden Tract since the fall of 1910, when about 7 acres of land on the east side was broken up and planted to winter rye. Since then winter rye has been planted and the green crop plowed under on a part of the tract, and several tests of irrigating and cultivating have been conducted on other parts. In the fall of 1913, winter wheat was planted on the 7-acre field above referred to and on some plats in Series M-I, which lies at the west side of the tract. In the spring of 1913, spring wheat, oats, sugar beets and alfalfa were planted in duplicate plats on M-I.

The results obtained with most of these crops this year are extremely encouraging. The winter wheat on the 7-acre field yielded at the rate of 38.7 bushels per acre. On Series M-I, there were 10 quarter-acre plats of winter wheat. The highest yield obtained here was 41.31 bushels per acre, the lowest 39.4 bushels, and the average 34.97 bushels per acre. The two plats of spring wheat yielded at the respective rates of 13 and 34 bushels per acre, and the two oats plats 9 and 48 bushels per

Reclamation of Worden Tract (continued)

acre, the lower yield in each instance being due largely to the work of chickens from the neighboring farm. The final results from the beets and alfalfa have not yet been reported, but the prospects for a successful stand of alfalfa were good at last reports.

The behavior of most of the crops planted on the tract furnished a striking contrast to the neighboring farm units, where the crops this year were almost all total failures, or where crop planting was abandoned altogether, on account of the refractory character of the soil. The results of the past treatment of the soil on the experiment field created a good deal of local interest, and many farmers are planning to apply one or more of the treatments to their own soils of similar character. It seems likely that the plowing under of rye as green manure will be the most popular treatment.

In addition to crop tests on the tract, determinations of the salt content of the soil (by means of the electrolytic bridge) have been made more systematically and extensively during the past year than previously. Five complete sets of soil samples have been taken at regular intervals during the year for soluble salt determinations. Each set comprises 53 cores of 6 samples each, the samples being taken at depths of 3, 6, 12, 24, 36 and 48 inches. A part of these determinations are made on untreated virgin soil, and altogether they will show the effects of the different treatments on the penetrability of the soil as indicated by the salt content after rains or irrigation.

It now seems probable that the lowering of the shallow water table is the chief problem remaining in the reclamation of the soils of this tract. On August 17, 1913, the depths to water in the 4 wells on the tract were 4.05 ft., 3.40 ft., 4.35 ft., and 3.80 ft., the average being 3.80 ft. Since this water table rises during

18 October, 1913.

Reclamation of Worden Tract (continued).

a part of the year to a point considerably higher than the bottom of the clay soil stratum, permanancy of the effects of surface soil treatments can not be expected until the ground water conditions are improved. It is expected that the proposed drainage work of the Reclamation Service will result in the desired improvement.

During the coming winter, the history of the Worden Tract will be written up and prepared for publication. This publication will describe in detail all the treatments applied and the results obtained.

FIELD NOTES.

Huntley.

During the week ending October 4, the maximum temperature was 82, minimum temperature 22, and the precipitation 1.85 inches.

Oats and flax in Field C were threshed; this completed the season's threshing. Sugar beets in Field M (Worden) were harvested: Plat MI-12 yielded 5437 pounds or at the rate of 10.97 tons per acre. Plat MI-18 has not been hauled because of rain. A heavy rain on Saturday was followed by snow.

San Antonio.

The maximum temperature for the week ending October 4 was 89, minimum 60, and greatest daily range 23. The total precipitation was 5.04 inches. The total precipitation to date since September 1 has been 12.25 inches. The recent heavy rains have caused serious floods in portions of Texas, San Antonio experiencing the highest water in years. Con-

18 October, 1913.

San Antonio (continued)

siderable damage was done to property when the San Antonio River flooded a part of the business section and filled many basements with water.

The weather permitted of very little field work. The Chinese corn on D3 was gathered. Cotton picking was in progress when interfered with by the rains.

Dr. D. A. Saunders spent a part of Saturday, October 4, at the farm, having been compelled to stop at San Antonio on his way to Victoria on account of train service being seriously interfered with by high water.

Truckee-Carson.

The Truckee-Carson Fair was held during the week ending October 4. The Crop Exhibits were larger than in previous years but would undoubtedly have been much larger and better had the Fair been held two weeks earlier. Much of the fruit and tender garden truck was frozen during the week before the Fair.

An interesting feature in the Live Stock Department was the Butter Fat contest in which ten cows competed. A Silver Cup, offered as a premium for the highest producer, was won by Dr. E. F. Dunbar, who has a herd of Holstein cows. Dr. Dunbar also won the Silver Cup in 1912.

The alfalfa in Fields F, D, Y and Z was cut. The third crop is very light owing to the scarcity of water since July.

18 October, 1913.

Truckee-Carson (continued).

STATEMENT SHOWING YIELD OF ALFALFA
VARIETIES IN ROWS FOR THE YEAR 1913.

SPI No.	Name	First Cutting Series A,	B,	A&B	Second Cutting Series A,	B,	A&B	Total Yield 1913
1551	Caucasian	Lbs. 100	100	200	Lbs. 49	68	117	Lbs. 317
1158	M. ruthenica	---	---	---	--	--	---	---
1123	Arabian	35	30	65	29	23	52	117
1174	Peruvian	120	120	240	67	59	126	336
1175	Grimm	125	115	240	59	60	119	359
1176	Sand Lucerne	125	110	235	50	42	92	327
1177	Turkestan	135	95	230	51	51	102	332
1178	Montana	138	115	253	58	48	106	359
1179	Canadian	135	85	220	54	51	105	325
1180	Western-Grown	125	125	250	59	56	115	365
1181	Province	100	90	190	48	48	96	286
1182	Elche	100	85	185	47	37	84	269

During the week ending October 4, the maximum temperature was 83, and the minimum temperature was 33.

BOUND VOLUMES WEEKLY BULLETIN.

Volume III of the Weekly Bulletin is being bound and mailed to the farms. This volume was closed June 30, but owing to difficulty in securing proper binding implements the making up of the volume has been delayed.

CORRESPONDENCE.

It is desired that hereafter all communications to the Washington office, except that intended for Mr. Farrell's personal attention, be directed to Mr. Scofield, rather than to the individual clerks who will ultimately handle the matters involved.

18 October, 1913.

SALTS IN IRRIGATION WATER AT BELLE FOURCHE.

During the past season it was observed that the irrigation water on the Belle Fourche Experiment Farm left a white deposit in the laterals and irrigation furrows. The deposit was unusually heavy and had some of the appearance of alkali salts. It was heaviest in the bottoms and on the sides of the laterals and furrows, but a considerable portion of the solids was carried laterally and then vertically by the water, so that light incrustations appeared on the soil several inches from the irrigation furrows and on the surface soil of the rows between the furrows. As no effect on the plants was noted, even where the crust lay against parts of the plants, it was believed that if the deposit consisted of alkali salts the latter were of a relatively harmless character.

In order to determine the nature of these salts, two samples were taken from a potato plat (No. 14) in Field A-I on August 4, a few days after irrigation. Number 1 was surface soil from the edge of the irrigation furrow just below the water mark, where the deposit was heavy. Number 2 contained the lighter deposit and was surface soil from the top of the potato row, near the plants and about 12 inches from the point where Number 1 was taken. The results of the analyses are given below:

Substance.	Content, in per cent.	
	Sample 1.	Sample 2.
Water soluble extract.....	0.867	0.559
CaO.....	0.119	0.109
MgO.....	0.042	0.035
CO_3.....	None	None
HCO_3.....	0.030	0.030
Cl.....	0.035	0.015
SO_4.....	0.517	0.369
Infusorial earth.....	None	None
NO_3, parts per million.....	100	14.

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Salts in Irrigation Water (continued).

It is seen that these soil samples contained a rather large percentage of water soluble matter--0.867 and 0.559, respectively--but that the major portion of this matter consists of lime and of the relatively harmless sulphates (expressed as SO_4). It is reassuring to note that there were no carbonates in the samples. It should be kept in mind that the samples were entirely surface soil--about the surface half-inch-- and that, therefore, normal soil conditions are not shown. Naturally, the salt concentration would be highest in the surface soil where evaporation had been highest.

The white material in the crust itself was found to be a mixture of calcium sulphate and sodium sulphate, in the proportion shown below:

	$CaSO_4$	Na_2SO_4
Sample No. 1.....	0.308%	0.391%
Sample No. 2.....	0.264%	0.220%

The determination of "infusorial earth" was made for the following reason. Some time ago a deposit which appeared to be alkali was observed on the Umatilla Project. Analyses showed, however, that that particular deposit was made up of diatoms. It was thought that the Belle Fourche deposit might be similar to the one found on the Umatilla. As is shown above, this was not found to be the case.

Further information relative to the irrigation water on the Belle Fourche Project will be secured this winter, when analyses of water from all our field stations are made.

F. D. F.

18 October, 1913.

FIELD NOTES.

Yuma.

During the week ending October 4th the maximum temperature recorded was 97, minimum 49, greatest daily range 48.

Later ripening varieties of grain sorghums on borders D 20 to 26 were harvested. Cotton picking continues.

Cowpeas planted on fig orchard lands C8 to 11 were turned under as a green manure. The peas were just filled in the pods.

Water has been shut off of fig plantings while they ripen the recent growth to go into the winter with least danger of frost injury.

The fifth cutting of alfalfa was harvested from Fields D 6 to 16, inclusive.

Deciduous orchard B25 to 30 was cultivated.

The wagon scales have been taken up, repaired and moved to a more convenient location.

A new planting of strawberries has been made on garden plot A 12_2; variety Arizona Everbearing was planted.

Mr. G. P. Rixford visited the farm on Monday and Tuesday for the purpose of observing the behavior of the fruiting hybrid figs, determining which trees would mature fruits without pollination by the aid of the Blastophaga.

Messrs. Cook, Collins and Gilbert stopped at the station Wednesday and Thursday to inspect the cotton experiments. Mr. McLachlan was up from El Centro during the same portion of the week to look over the cotton about the valley and at the farm.

Dr. P. A. Yoder paid a visit at the station Friday (Oct. 3) to look over sugar crop producing soils. The small amount of cane growing in the valley is not doing extremely well, but it has suffered from neglect and its condition does not seem to be sufficient evidence to discourage the sugar cane experiments planned for next season. The seed cane for these experiments will not be imported until early spring at which time a more thorough inspection can be made to detect harboring insect pests.

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FIELD NOTES.

Belle Fourche.

During the week ending Oct. 11, the maximum temperature was 64, minimum 28, and precipitation .49 inches.

No field work was done during the week, the ground being too wet. The work on the seed house was continued and all the material hauled.

A well was dug on Deadman Creek and a fair supply of water secured at a depth of 10 feet.

Umatilla.

During the week ending Oct. 4 the maximum temperature was 86, minimum 31, and greatest daily range 50.

The fourth crop of hay was hauled in, and some idle land was sown to rye.

Powdery dry rot is affecting the potatoes from the variety test and has necessitated their being sorted before hilling up for the winter.

Mr. H. K. Dean left the Farm Wednesday to take up graduate work in irrigation at the Utah Agricultural College.

San Antonio.

The maximum temperature for the week ending Oct. 11 was 91, minimum 58, and greatest daily range 24. The total precipitation was 1.13 inches.

As soon as field work was possible the teams were started disking the plats to be seeded to oats. Cotton plats to be seeded to oats were cleared and plowing started, the following plats being plowed: A4-14 and 18, and C5-5, 10 and 14. Cotton stalks on C3 where the oat pasturing experiment will be conducted, were raked and burned. The second picking of cotton on the rotation plats was completed.

Hauling of the first cutting of forage sorghum was completed.

Dr. P. A. Yoder, of the Office of Cotton and Truck Crop Diseases and Sugar Plant Investigations, was a visitor at the Farm on the 9th.

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FIELD NOTES.

San Antonio (continued).

Oat Pasturing Experiment.

Owing to much damage resulting from the lodging of oats on the rotation plats the last two seasons, it has been considered desirable to inaugurate an experiment in pasturing oats to determine the effect of such treatment on the later development of the crop. The lodging appears to be due to excessive vegetative growth during the early part of the season when frequent rains and other weather conditions are most favorable to rapid growth. When the vegetative growth is excessive during the favorable part of the season, much lodging occurs, and, furthermore, the crop's water requirements become so high that when dry weather ensues many of the plants fail to mature heads. This results in low yields and relatively high proportion of straw to grain. This latter fact was very noticeable during the past season, as is shown below.

The average grain yield of 7 oats plats in the rotation field was 13.4 bushels per acre, and the average ratio of straw to grain was 4.8 lbs. of straw to 1.0 pound of grain. On the lowest yielding plat of the 7 (plat A5-15--which yielded only 6.3 bushels per acre) the ratio of straw to grain was still higher - 8.9 to 1.0; whereas on the highest yielding plat (A4-5, which yielded at the rate of 38.8 bushels per acre, and on which it was noted that the vegetative growth was not abnormally high) the ratio of straw to grain was only 2.5 to 1.0. This is approximately a normal ratio.

The idea underlying the plan for pasturing oats is that proper pasturing should prevent excessive vegetative growth, and hence result in increased grain yields, at the same time producing some income through the support of the pastured stock.

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FIELD NOTES.

San Antonio (continued)

The experiment will be carried out on Field C3 as follows: Five plats of 1/4 acre each will be seeded to oats about October 15. Plat 1 will not be pastured. Pasturing of the remaining four plats will be started as soon as the oats have made sufficient growth to afford good pasturage, which ought to be about December 1. Pasturing will continue, during favorable weather, until the cows are removed from the respective plats in the following order:

Plat 2..... January 1
Plat 3..... January 20
Plat 4..... February 10
Plat 5..... March 1

It is believed that these variations in the duration of the pasture period will indicate approximately how much pasturing oats will stand under our conditions, and how late in the season it will be desirable to continue pasturing.

The first cutting of forage sorghums in the rotation field resulted in the yields given below. A heavy second crop will be secured, but will not be ready to cut for several weeks.

	Plat No.	Date cut	YIELD Pounds Per plat	Pounds Per acre	Tons Per acre
6-inch drills	A4-13	July 15	2270	9080	4.54
	A4-17	" 15	2122	8482	4.24
	B4-13	" 15	2118	8472	4.24
	B5- 6	" 15	1408	5632	2.82
	B5-12	" 15	2214	8856	4.43
	B5-16	" 15	2070	8280	4.14
Average.....		.....	.....	8135	4.07
4.1 feet drills	A4- 9	July 25	1822	9110	4.55
	A6- 4	" 14	1890	7560	3.78
	B5- 5	" 14	2350	9400	4.70
	B5-10	" 14	2435	9740	4.87
	B5-14	" 14	2512	10048	5.02
Average.....		.....	.....	9171.6	4.58
General average		.....	.....	8606	4.30

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FIELD NOTES

San Antonio (continued).

The yields of Sudan grass on Plat B4-14 were as follows:

Plat No.	YIELD						
	1st cutting		2nd cutting		Total Yield		
					Pounds		Tons
	Date	pounds	Date	pounds	plat	acre	per acre
B4-14	6/4	1050	7/15	784	1834	7336	3.67

The cotton yields on the rotation plats were as follows:

	First Picking	Second Picking	Total Plat	Total Acre	Number of plants per acre.	Percentage of stand
	(Pounds)	(Pounds)	(Pounds)			
Maximum.....	183.5	32.5	190.0	760.0	11,004	104.3
Plat	B6-6	B5-9	B6-6	B6-6	B5-3	B5-3
Minimum.....	67.0	1.0	87.5	350.0	8,660	82.1
Plat	B5-9	B5-4	A4-1	A4-1	B6-8	B6-8
Mean.....	132.1	7.1	139.2	560.1	9,414.7	89.18

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NOTES AND SUGGESTIONS ON HOGGING EXPERIMENTS.

The experiments at the Huntley, Belle Fourche and Scottsbluff Experiment Farms in which hogs have been used in the disposal of alfalfa and corn, and the proposed extension of this kind of work through cooperation with the Bureau of Animal Industry have called up some points to be considered in connection with these and similar tests. It is important that some fundamental views of the situation be established and it seems desirable that a few suggestions in this direction be made for the consideration of the field men.

The fact that our portion of the work will be done under irrigated conditions, where many of the results are likely to differ from those obtained in similar work on the dry lands or in humid districts, emphasizes the desirability of close observation in the simple, preliminary tests. Such observation is necessary in order that the more elaborate experiments which it is hoped will be conducted in the future may be comprehensively planned and intelligently carried on. The suggestions given below relate particularly to the practices of hogging corn and pasturing alfalfa with hogs, although some of them relate in a general way to other live stock activities.

The primary consideration in hogging off irrigated crops is, of course, the crop disposal possibilities. In the irrigated regions, the distance to large marketing centers, the high transportation charges, and the inadequate transportation facilities, both from the farm to the railroad shipping point and from there to the marketing center, all combine to make crop disposal through the ordinary channels a difficult and acute problem. Another important point to be kept in mind is the ratio of feed consumed to meat produced. This is particularly important, in a practical way, in that only through some knowledge of this ratio can a farmer intelligently adjust the number of live stock kept or purchased to the probable crop yields of his farm. The farmer must know in a fairly definite way how many hogs of a certain age an acre of alfalfa or of corn will support for a given time, so that he can make the necessary

Notes and Suggestions on Hogging Experiments (continued).

arrangements for his enterprise. A third consideration is the labor relationships. Any method which simplifies the labor problem on the irrigated lands, where labor is both extensive and difficult to obtain, has much to commend it. A fourth, and very important, consideration is the determination of methods of hogging whereby the irrigation farmer can secure the highest efficiency in crop disposal and labor economy - methods which will minimize labor requirements, and maximize the feed efficiency, and at the same time produce a maximum cash return.

Some Indications of Crop Disposal Possibilities.

Although the work so far done with hogs on our field stations is of a very simple character, it has already resulted in some very encouraging indications of the crop disposal possibilities. A few figures relating to the results obtained are given herewith, together with some comparisons with results obtained elsewhere in corn hogging and alfalfa pasturing experiments.

Alfalfa. - From May 2 to July 2, 1913, five fall pigs were pastured on a 1/4-acre plat of alfalfa planted in 1912 at the Scottsbluff Experiment Farm. The 60 days of the pasture period ended at the same time that the first crop on the 11 other alfalfa plats in the same field was cut. When these hogs were taken off the plat, 12 spring pigs were put on for the remainder of the season. The results with the second lot have not yet been reported. The first lot gained in 60 days 381 pounds. At 7½¢ this meat was worth $28.58. Deducting from this the value of corn fed (18.7 bushels at 60¢, or $11.22) leaves $17.36. When figured on an acre basis, the results are: 1524 pounds of meat with a value of $114.30; or, deducting the cost of corn fed and disregarding the labor expense, the net returns were $69.44 an acre. The average

Notes and Suggestions on Hogging Experiments (continued).

yield of alfalfa on the 11 plats in the same field was 1.84 tons per acre, and the local market price was $6 a ton. Assuming that the pastured plat would have yielded 1.84 tons per acre, the market value of the hay would have been $11.04, while the hogs paid $69.44, or about $38.00 a ton. When the cost of harvesting and marketing the hay is considered, it appears that it is justifiable to ignore the slight labor cost of pasturing in making the above comparison.

At the Huntley Experiment Farm, in 1913, 12 spring pigs were pastured on a quater-acre plat of alfalfa for 39 days, beginning just after the removal of the second cutting of alfalfa. The pasture period corresponded to the period of growth of the third crop. Figuring in the same manner as in the above paragraph - except that the local price of corn was 90 cents a bushel, and of hogs 8 cents, instead of 60 and 7½ - the results are: gain in weight, 209 pounds; value of gain after deducting cost of corn fed, $8.91; or, on an acre basis: meat produced 836 pounds; net value $31.24. The average yield of the third cutting of 13 comparable plats of alfalfa in the same field was 1.38 tons per acre. Assuming this yield to be representative of the yield of the pastured plat, the hogs paid $22.63 a ton for the alfalfa consumed.

There is a point to be kept in mind in this connection relative to the proportion of the gains to be accredited to each feed - the alfalfa and the corn. Obviously, the gain in weight is due to both the corn and the alfalfa, and where it is desired to determine the price paid by the hogs for each feed it is necessary to accredit a portion of the gain to each. A method used by some experimenters is to accredit 10 pounds of gain to each bushel of corn fed, and to give the alfalfa credit for the remainder of the gain. Where, as in the present instance, it is desired merely to determine the value which a farmer may secure from his alfalfa, however, it is perfectly proper to fix that value as the net amount left after deducting the actual cost of the corn fed. This is the method used in the two preceding paragraphs.

Notes and Suggestions on Hogging Experiments (continued).

It is interesting to compare the results at Scottsbluff and Huntley with those of a hog pasturing experiment in an unirrigated district. The Missouri Station reports (Bull. #95 - 1911) the results of pasturing hogs on different crops, the test including blue grass, alfalfa, clover, rape-oats-clover, sorghum, cowpeas, soybeans, corn and rye. Alfalfa proved to be the best forage crop in the test in point of pork produced per acre. The figures represent the results of an entire season. After deducting the pork assumed to have been produced by the corn fed (10 lbs. of pork for each bushel of corn) alfalfa was credited with 596.8 pounds per acre; clover, 572.2 pounds, and the others ranged from 394.0 to 183.1 pounds. Calculating the Scottsbluff and Huntley results to the same basis: Scottsbluff, 60 days only (first crop) 776.0 pounds per acre; Huntley, 39 days only (third crop) 440 pounds per acre. These comparisons certainly look well for the irrigated alfalfa.

Corn.— In the fall of 1912, 7 hogs (1 sow and 6 barrows) were allowed to hog off a quarter-acre plat of corn at the Scottsbluff Farm. They were given no supplementary feed. The hogs were left on the plat 13 days, and gained 157 pounds, or 628 pounds per acre. At the then current market price of hogs (8 cents) this gain was worth $50.24 an acre. The average yield of 5 comparable plats of corn was 56.1 bushels per acre. Assuming that this represented the yield of the hogged plat, the hogs paid 90 cents a bushel for the corn consumed.

At Huntley, in 1912, 5 hogs were left on a quarter-acre plat of corn for 16 days. They gained 97 pounds, or 388 pounds per acre, which at 8 cents was worth $31.04. The average yield of 4 comparable plats was 36.4 bushels per acre. Calculating as above, it is found that the hogs paid for the corn consumed 85.7 cents a bushel.

A similar experiment was conducted on the Belle Fourche Farm, in 1912. Two hogs were on the corn plat for 26 days, and gained 85 pounds, or 340 pounds per acre, which at 8 cents was worth $27.20. Seven comparable plats averaged 29.9 bushels per acre. Assuming that this average is representative of the quantity of corn consumed by the hogs, the latter paid 91 cents a bushel.

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Notes and Suggestions on Hogging Experiments (continued).

The Iowa Station reports (Bull. #143 - 1913) some experiments in hogging corn, the results of which afford some interesting, but not strictly accurate, comparisons with the results given above. The comparisons are not strictly accurate because the Iowa hogs were on the corn for a much longer period - 54 to 76 days. Where corn was hogged and no supplementary feed was given, the gain per acre was 357 pounds; and the hogs paid 63 cents a bushel for the corn consumed, the yield being estimated at 46 bushels per acre, and 8 cents a pound being allowed for the hogs. Where supplementary feeds were furnished, the gains were greater, and the prices the hogs paid for the corn considerably higher. In three such instances, the prices were 100, 93, and 116 cents. More will be said below about supplementary feeds.

The above figures on the use of hogs in the disposal of alfalfa and corn on the irrigated lands are, while not at all exhaustive, strongly suggestive of excellent possibilities.

Feed Efficiency.

The hogging work so far conducted on our field stations has not been sufficiently exhaustive to furnish any very reliable data on the efficiency of alfalfa and corn when hogged off; but a few figures relating to our results will be of interest. The efficiency calculations on corn in the hogged plats and on alfalfa in the pastured plats are based on estimated yields of corn and alfalfa, the average yields of comparable plats in the same field being assumed to be representative. The calculations on corn fed in connection with alfalfa pasturing are based on actual weights of corn fed. The experiments referred to are those discussed above under the heading "Crop Disposal Possibilities".

Alfalfa. - At Scottsbluff (May 2 to July 2, 1913) 5 hogs gained 381 pounds on 1/4-acre of first crop alfalfa, 1047 pounds of corn being fed in addition to the alfalfa. The estimated yield of alfalfa on the plat was 920 pounds. On this basis, 2.41 pounds of alfalfa was

Notes and Suggestions on Hogging Experiments (continued).

required for the production of one pound of pork. The corresponding figure from the Huntley experiment (39 days, third crop) is 3.30. Strictly comparable figures from experiments in humid districts are not at hand.

Corn. - In the two above mentioned experiments with alfalfa pasture at Scottsbluff and Huntley, the efficiency of the corn fed was as shown below. The corn was weighed, and fed at the rate of approximately 2 pounds a day for each 100 pounds of live weight. Scottsbluff: 1047 pounds of corn for 381 pounds of gain, or 2.75 pounds of corn for each pound of pork. The corresponding figure in the Huntley experiment was 2.65. Similar figures from the Nebraska Station (Bull #99) where hogs pastured on alfalfa were fed varying quantities of shelled corn show the following pounds of corn for each pound of gain:

	Daily gain	Lbs. corn for 1 lb. gain.
0.5 lbs. for each 100 lbs. live weight..	0.4	1.28
1.1 " " " " " " " ..	0.5	2.21
2.6 " " " " " " " ..	0.8	3.31

These figures indicate the variations in the efficiency of corn due to the quantity fed, and suggest the desirability of studying the relationships between the market values of corn and alfalfa on the one hand, and the quantity of corn fed on the other.

The figures on the efficiency of corn when hogged off in the experiments at Scottsbluff, Huntley and Belle Fourche in 1912 are probably not very reliable because the corn yields are estimated, but they are nevertheless interesting. The experiments are those discussed above under the heading "Crop Disposal Possibilities", and the

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Notes and Suggestions on Hogging Experiments (continued).

figures below are reduced to the acre basis.

Farm.	Estimated corn yield	Lbs. gain per acre.	Lbs. of corn for 1 lb. gain
Scottsbluff	3141 lbs.	628	5.00
Huntley	2038	388	5.25
Belle Fourche	1674	340	4.92

The three efficiency ratios, which have an extreme range of only 0.33 pound, show a rather striking proportionality between estimated yield and meat gain at the three farms.

Similar figures reported by the Iowa Station (Bull. #143 - 1913) are:

Standing corn only.....	7.21
Standing corn, with growing soy beans.....	4.39
Corn only, in feed lot.....	6.08

These figures show a decided increase in the efficiency of corn when the latter is supplemented by a green feed. On account of various differences in the experimental methods employed at Ames and at our field stations, the above comparisons are only approximately correct.

Alfalfa and Corn. - The efficiency of alfalfa and corn combined, in the proportions used in the two pasturing experiments at Scottsbluff and Huntley, may be of some interest. The figures are tabulated below:

Farm	Feed Consumed, Lbs. Alfalfa	Corn	Total	Meat Produced per 1/4 acre	Lbs. feed for 1 lb. of meat
Scottsbluff	920	1047	1967	381	5.16
Huntley	690	554	1244	209	5.95

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Notes and Suggestions on Hogging Experiments (continued).

Labor Economy.

Our work with hogging corn and alfalfa has been done on such a small scale that it has not been possible to collected much reliable information relative to the labor requirements. It is hoped that some estimates may be made and reported later. The labor element is decidedly important. It is desirable not only to know the average labor expense of hogging an acre of corn or alfalfa, but also to devise methods of reducing this expense, and to determine what are the most economical adjustments of size of field, number of hogs, duration of hogging period, etc. These and several other similar questions are for future investigation on the irrigated lands.

Future Work.

It is not yet known in what directions our future work with hogging will tend. Much depends on the outcome of the proposed plans of cooperation with the Bureau of Animal Industry. It is hoped that facilities will be provided for the investigation of a large number of important problems which have had little or no study under irrigated conditions. One of the most important of these is the question of supplementary feeds. In many irrigated sections corn is grown with much difficulty and uncertainty, or not at all. This condition necessitates the investigation of other carbonaceous feeds - wheat, barley, etc. - for supplementing alfalfa pastures. Satisfactory nitrogenous crops must also be found for supplementing corn in hogged-off fields, and methods for their utilization must be perfected.

Other points to be investigated are size of fields, maturity of corn to be hogged, duration of pasture period, carrying capacity, age and character of hogs, treatment of alfalfa pastures, crop rotations, fencing, shelter and water for hogs, and the effect of hogging on the soil and on crops grown in succeeding years.

It is hoped that all the field men will give these matters their attention, and be ready with suggestions and tentative plans when the time comes to make definite arrangements for carrying on the work which will probably be initiated in the near future.

F. D. F.

25 October, 1913.

FIELD NOTES.

Huntley.

During the week ending October 11 the ground was too wet for any field work, due to the heavy rains and snow of the previous week.

Mr. J. S. Cole visited the station on the 10th of October.

Fertilizer Test.

At the request of the Montana Experiment Station, the following test was conducted on Field B-VII in 1913. The land used produced oats in 1911 and beets in 1912. The fertilizer applied was acid phosphate, and the rates of application were 300, 500 and 700 pounds per acre. The same applications were applied to wheat (Pringle's Champion) - oats (Swedish Select)-and barley (New Zealand), one plat of each being untreated. Twentieth-acre plats were used. The test was not duplicated. The preparation of the land, after beet harvest, consisted of disking, harrowing, and leveling just before the grain was seeded on April 29. The fertilizer was worked into the soil by the operations necessary to prepare the seed bed. The wheat was planted at the rate of 2 bushels per acre, and the oats and barley each at the rate of 100 pounds per acre. All the plats were irrigated uniformly, on June 27 and July 14. No differences in the color or vigor of the crops on the different plats were noticeable during the growing season, and there was no lodging on any of the plats.

In the table below, columns 1, 2, 3, 6 and 7 are self-explanatory. The height was obtained at the time of maturity, and the figures given represent the average height of the plants on each plat. The stand was determined in the late spring when

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FIELD NOTES.

Huntley - Fertilizer Test (continued).

the plants were all up, and each figure represents the number of thousands of plants per acre; that is, ",000" is omitted from the figure. In the last column the figures indicate the number of pounds of straw which accompanied the production of each pound of grain.

Crop	Plat	Acid phosphate, pounds per acre	Height inches	Stand	Yd. per acre. Straw Lbs.	Yd. per acre. Grain Bus.	Ratio of straw to grain
Wheat	BVII-1	None	40	337	2880	42.0	1.14
"	-2	300	42	380	2740	46.0	1.00
"	-3	500	40	437	3500	48.3	1.21
"	-4	700	42	395	2480	48.6	0.85
Oats	BVII-5	None	40	598	3200	106.2	0.94
"	-6	300	38	640	2000	71.8	0.87
"	-7	500	40	642	3300	118.7	0.87
"	-8	700	39	656	3660	107.5	1.06
Barley	-9	None	32	480	1840	63.0	0.72
	-10	300	33	444	1580	67.0	0.49
	-11	500	29	437	2380	50.4	0.90
	-12	700	32	417	1780	67.0	0.55

The table shows that no consistent differences, large enough to be considered significant, were obtained in the test. No consistent relationship appeared between the quantity of fertilizer and the estimated height of the plants,

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FIELD NOTES.

Huntley - Fertilizer Test (continued).

but it is of some interest to note that with wheat and barley the ratio of straw to grain was highest where the height of the plants, as estimated, was least.

Belle Fourche.

During the week ending October 18 the maximum temperature was 80, minimum temperature 23, and precipitation .01 inch.

The digging of sugar beets and potatoes was commenced on Monday and continued during the week. This work is about two-thirds completed. Other work for the week consisted of plowing in Fields I and K, and O and P, and carpentry work on the seed-house.

Scottsbluff.

There was a decided change in the weather during the week ending October 18; although there were no storms, high winds and cloudy weather prevailed.

During the week all of the odd rows of potatoes in Field K, the rotation field, were graded according to size. The odd rows of sugar beets were also harvested, and the beets counted and weighed.

The sugar beets have all been harvested, and the hauling of the third cutting of alfalfa will begin as soon as the weather is favorable.

Corn husking was begun, but discontinued on account of the high winds blowing the fodder away. The dry land fodder was hauled off the land and

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FIELD NOTES.

Huntley - Fertilizer Test (continued)

weighed. In order to haul this fodder it was necessary to construct a wind shield on the side of the hay rack, using a tarpaulin for this purpose.

The potato yields on Field K were as follows:

Rotation.	Series.	Plat.	Pounds per plat.	Bushels per plat.	Bushels per acre.
4	I	1	3389	56.5	226
27	I	5	2537	42.3	169.2
25	I	15	5225	87.1	348.4
21	I	17	4742	79.	316
26	II	2	3618	60.3	241.2
31	II	2	5300	88.3	353.2
61	II	11	5705	95.1	380.4
40	II	15	6047	100.8	403.2
20	II	17	5975	99.6	389.4
30	III	5	4942	82.4	329.6
60	III	11	4831	80.5	322.
44	IV	15	6023	100.4	401.6
24	IV	17	3519	58.7	234.8
			Average yield per acre.....		316.5

The above yields are field run, the percentage of culls has not been figured at this time.

Experiment with Hogging Off Corn.

The hogs on the "corn hogging" plat were taken off. Mr. Morgan, who has been looking after this work, reports as follows:

On September 26, 1913, four of the best barrows used in the pasture test with alfalfa, two Poland China, farrowed April 26, and two Duroc, farrowed about April 15, were placed on corn plat K-II-3. They were in good growing condition at the time they

25 October, 1913.

FIELD NOTES.

Huntley - Experiment with Hogging Off Corn (continued).

were placed on the corn. The following table shows gains:

No. of Hogs	Breed	Sept.26 Weight	Oct.19 Weight	Total Gain	Gain per day Pounds
1	Poland China	74	118	44	1.91
2	" "	72	114	42	1.82
3	Duroc	89	140	51	2.21
4	"	93	148	55	2.39
				192	

On the local market hogs are selling from 8 to 8½ cents. Figuring at 8 cents this gives a gain of $15.36 or $61.44 per acre. As nearly as can be estimated there were about 15 bushels of corn on the plat or a yield of 60 bushels per acre. This would give $1.02 per bushel for the corn, which is worth locally from 90 to 95 cents per bushel. Because of the fact that corn bought locally must be shipped considerable distance, the price is rather abnormally high. This test then gives between 5 and 10 cents more per bushel for the corn than could have been obtained had it been husked from the field and marketed. It is very doubtful whether the value of the fodder obtained by harvesting the corn in a less mature stage would have been sufficient to compensate for the increase obtained by "hogging".

Yield of Potatoes.
Field K

Plat	Rot. No.	Stand Plants per A	Yield Pounds Plat	Yield Bushels Acre	% Marketable Tubers
K-III-3	61 F	5244	4153	276.8	96.4
-9	60 F	4656	4280	285.3	96.7
-15	31 C	4440	2396	159.7	93.7
K-IV- 2	40 D	4884	3754	250.2	96.3
- 5	25 B	5184	5431	362.	96.4
-12	44 D	2848	1692	112.8	94.5
-17	30 C	4940	2824	188.2	95.4
-21	4 (CC)	4048	2907	193.8	96.9
K-V- 6	20 B	3976	2997	199.8	96.5
-10	24 B	4832	4742	316.1	96.6
-12	26 B	3980	2373	158.2	94.6
-14	21 B	4616	3392	226.1	94.2
-19	27 B	1500	540	36.	92.6
Average		4242		212.7	95.4

25 October, 1913.

FIELD NOTES.

Huntley (continued)

During the week ending October 17 potatoes in Field K were harvested, and part of the corn husked.

Mr. J. S. Cole visited the Farm on October 17.

San Antonio.

The maximum temperature for the week ending October 18 was 87, minimum (as recorded by the thermograph) 53, greatest daily range 27, and precipitation .07 inch.

During the week oats were planted on C3 and in the pasture. B6-17 was planted to rye, and the following plats to Canada field peas: A4-12, A4-16, A4-19, B4-17, B6-7, and B6-9.

Plats B6-7 and 9 were manured before being planted to peas. Cotton picking on AB8 was resumed. Difficulty is being experienced in picking this and avoiding an excessive amount of trash, because of the condition in which the bolls were left by the rain. A part of the cotton stalks on the rotation plats were cut and burned. Fallow and recently plowed plats were cultivated.

Mr. Letteer left for Oklahoma on the 18th, to be gone until after November 1.

1 November, 1913.

FIELD NOTES.

Truckee-Carson.

During the week ending October 11, the maximum temperature was 71, minimum temperature 21, and precipitation .04 inch.

Yield of Third Cutting of Alfalfa Hay.

Field	Area	Pounds, Yd. per acre.
N-9-10	.37	3650
Z-2b to 6b	1.50	1140
D-1 to 7, inc.	3.78	291
E-1, 3, 5.	1.56	730
F-5	.30	1500
6	.37	1220
10	.34	1410
11	.44	284
12	.76	1680
13	.60	417
14	.60	1000
17	.43	1975
18	.37	1500
19	.35	1930
20	.35	1855
21	.35	1600
22 to 27 inc.	1.92	248
29	.39	705
30	.39	640

Truckee-Carson Sugar Beet Contest.

The results of the sugar beet contest at the Truckee-Carson Fair were as follows: There were 32

Truckee-Carson Sugar Beet Contest(continued).

entries of 10 beets each. The exhibits were scored on a basis of 15 points for size, 25 for shape, 10 for history of cultivation, and 50 for sugar content. Three beets-the largest, the smallest, and one of medium size-were taken from each exhibit for the determination of sugar content, all three being pulped, mixed and analysed as one sample. The highest score made was 93.5, and the lowest 53.3. The highest sugar content found was 17.9 per cent (in the beets receiving the highest score) the lowest was 11.1 per cent. The average sugar content of the 32 samples was 14.4 per cent. The scoring was done by Professor S. C. Dinsmore, of the University of Nevada.

Dairy Cow Importation to the Truckee-Carson.

A clipping from a newspaper published at Fallon announces that 110 cows and 135 head of young milk stock have recently been shipped to the Truckee-Carson Project from the San Joaquin Valley of California to be distributed among the farmers of the Project. The importation was financed by Mr. George Wingfield, a leading mining and banking man of Nevada, who has some agricultural interests in the vicinity of Fallon. The cows, which were purchased in the Modesto and Turlock districts, are principally grade Jerseys, but they are reported to be of unusually large size for that breed. The method to be used in selling the cows and the terms upon which the farmers will pay for them are not reported. The importation and the disposal of the cows are in charge of Mr. C. J. Heisey, who was formerly employed by this office as assistant to Mr. Headley, and who is now local manager for the Wingfield interests at Fallon.

1 November, 1913.

REPORTS ON FIELD EXPERIMENTS.

Difficulty is frequently experienced in interpreting results reported by the field men because of the incompleteness of the reports. In connection with the rotation experiments, this difficulty is seldom met because the plans of the rotation work show in a rather definite way most of the details of each rotation. This is not true, however, in the case of special tests, of which there are several on each farm, and which are frequently planned and carried out by the field men without there being any detailed plan on file in the Washington office. It is to such experiments principally that the following suggestions are intended to apply.

In general, it is desirable that the final report for the year on any test should include in some form all the information, relative to the test, that has been secured by the field man. It frequently appears as if one or more of the really important details are so well known to the field man that he fails to appreciate their importance, or forgets that others are not as familiar with the details as he is. Omissions resulting in this way often greatly reduce the value of a report and make it necessary to call for a supplementary statement. This causes delay, inconveniences the field man, confuses the files, and lowers efficiency generally.

The value of having all essential details included in the reports increases with the age of the reports. When the results are first reported, details are fresh in the minds of the field men, and it is usually possible to get a satisfactory supplementary statement if it is called for at once. But as time goes on, it becomes increasingly difficult for the field men to supply the additional information when it is called for; and, furthermore, changes in the personnel in the field and in Washington would make it impossible in many cases to secure the desired data at all.

Reports on Field Experiments (continued).

Some of the points which are more or less frequently omitted are the following: Field and plat numbers, size of plats, crops grown on the land during 2 or 3 preceding years, variety planted, land preparation, irrigation, rate and date of seeding, stand (including time and method of estimation) dates of maturity and harvest, height of plants (including time and method of estimation) yields of straw or fodder, and character and quantity of fertilizer, if any, used.

A large number of the reports fail to include one or more of these points. In certain experiments some of these points do not need to be determined; but in many cases where they are determined some of them are not reported. On the other hand, some of them are almost never omitted. No fact which the field man has taken the trouble to determine should be left out of the reports. The latter are the final records of the field man's activities, and anything which has been worth determining is worth recording.

The field and plat numbers are seldom omitted, but there have been enough instances of omission to warrant calling attention to this point. The previous crop is frequently not stated. The importance of this point is obvious. The name of the variety is very often left out. The fact that varieties of the same crop differ widely in their behavior under similar conditions makes it desirable that the varietal name be given in all instances. It is very desirable that the operations involved in the preparation of the land and the cultural operations following planting be indicated. The dates of irrigation should always be given, as should the rate and date of seeding. Where the stand is determined, it should be included in the report because variations in the stand are frequently responsible for what would appear to be contradictory results when the stand is not reported. Some of the field men have adopted the suggestions made on Page 181, of Volume II, of the Weekly Bulletin, in estimating and reporting crop stands, and the results are very satisfactory. Where the stand

Reports on Field Experiments (continued).

is reported, it is desirable that both the time and method of estimation be given. Such items as date of maturity, date of harvest, height of plants, and the yield of straw or fodder as well as that of grain, are often helpful in interpreting results.

The above-mentioned points are rather formal and apply to practically all crop experiments. Some others which are of a more special character might be suggested. In the matter of fertilizers, the nature and quantity of the latter are sometimes rather loosely reported. Nitrogenous or phosphatic fertilizers are referred to as "nitrates" or "phosphates". Sometimes the exact nature of these fertilizers can be ascertained from correspondence on file in the office, and sometimes it can not. The reports should state, if possible, the chemical composition of each. Frequently this is indicated on the bags in which the fertilizers are received at the farm. In reporting results obtained with farm manures, the number of loads, or preferably pounds, applied per acre, should be stated. In the reports of the results of special cultural methods, these methods should be briefly described. It is not sufficient to report plowing or subsoiling as "deep" or "shallow", or the time of cutting a crop as "early" or "late", or irrigation as "frequent" or "infrequent". Approximately exact depths, exact dates, etc., should be stated. In cases where special implements are used, the implements and the methods of operation should be described. While some of these points are usually ascertainable from the correspondence on file, it is much more satisfactory to have them all included in the report itself.

Another point which is often not included, but which might well be in most cases, is the fieldman's own comments on the results. Such comments are usually very valuable, because the field man is in a position to watch the crop throughout the growing season, and this gives him a decided advantage in interpreting results. In brief, these comments should ordinarily include a statement of any special factors or conditions affecting the experiment, and the fieldman's

Reports on Field Experiments (continued).

own interpretation of the results.

To include most of the formal notes mentioned above is a very simple matter. Most of them need not be tabulated; the facts can be briefly stated in a paragraph preceding or following the tabulated matter. So many of the conditions are uniform in each experiment that it is only a waste of time to repeat, for instance, the date of seeding, size of plat, etc., (when these are uniform) for each plat reported in the table. It is better to furnish a paragraph similar to this: "The experiment was conducted on Field BVII, where beets were grown in 1912 and oats in 1911. The plats were twentieth-acres. Swedish Select oats and Pringle's Champion wheat were used. The land was prepared by double-disking, one harrowing and one leveling immediately before the grains were planted on April 29. Wheat was seeded at the rate of 2 bushels and oats at 100 pounds per acre. All plats were irrigated twice, uniformly, on June 27 and July 14....." etc. When all the uniform, readily summarized notes are given in some such manner as this, the variable notes-yields of straw and grain, height, date of maturity, etc. can easily be included in a tabulated statement. Some of our best reports are made in this way.

A list of important points, one or more of which are omitted from the reports sent in from the field, would doubtless include more than are indicated above; the omissions noted have been selected from some of the more recent reports. Some of these points are pertinent to some experiments and some to others. It would be a good practice for the fieldman to look over the following list before submitting a report, and to see to it that the report includes all the pertinent points in the list:-

1 - Field and plat numbers.
2 - Size of plats.
3 - Previous crops (2 or 3 years).
4 - Variety used.
5 - Land preparation (character of operations, and dates of application).

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Reports on Field Experiments (continued).

6 - Irrigation (with dates of application).
7 - Cultural operations after planting (dates and character).
8 - Rate of seeding.
9 - Date of seeding.
10 - Stand (including date and method of estimation).
11 - Dates of maturity and harvest.
12 - Height of plants (including date and method of estimation).
13 - Yields (straw, fodder, grain, tubers, tops).
14 - Fertilizers (quantities, character).
15 --Special methods:
  (a) Description of implements.
  (b) Methods of use (with exact figures).
  (c) Dates of operations.
16 - Fieldman's comment:
  (a) Special factors or conditions.
  (b) Interpretation of results.
  (c) General notes.

It is suggested that each fieldman make up a list of the above points, together with any others he may wish to add, and place it conspicuously in his office for the use of himself and the farm clerk when reports are being made up. Such a practice, if consistently followed, will result in a decided improvement in the field reports and in increased efficiency of the work of the field stations.

F. D. F.

1 November, 1913.

FIELD NOTES.

Yuma.

Maximum temperature for the week ending Oct. 11 was 89, minimum temperature 36, and the greatest daily range 49 degrees. A white frost occurred three successive nights, the 6th to 8th inclusive, while the lowest minimum reached was 36 degrees. Frost at this time was unusually early and severely damaged several cotton fields of late plantings near the river. The lower bolls were just maturing while the top crop was destroyed. Cotton on the farm was not injured. Picking continues of both Egyptian and Durango plantings.

Alfalfa on B 31-32 was harvested. Also, alfalfa on the "D" series was renovated. Cowpeas in B 18 to 24 were plowed under as a green manure crop. Clearing on B 13 to 17 was begun.

Lumber was hauled from Yuma for constructing a temporary bunk house.

The maximum temperature for the week ending Oct. 18 was 96, minimum temperature 39, and the greatest daily range 54 degrees.

During the week cotton picking was continued. Late ripening plantings of grain sorghum were harvested from borders A-4, C-37 and D-25 and 26.

Cowpeas on $A\text{-}10_3$, $A\text{-}14_{7 \text{ and } 8}$ and $A\text{-}15_2$ were plowed under for green manure.

Messrs. T. H. Kearney and Argyle McLachlan spent three days at the station and about the Valley. A trip in the lower Yuma Valley on Tuesday was made for the purpose of judging cotton possibilities for that section.

Mr. Ratliffe made a trip to various points in the Salt River Valley where Egyptian cotton is being ginned, preparing to open the gin at the farm. This gin will begin operating the coming week.

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FIELD NOTES.

Yuma (continued).

The frame work of the bunk house was completed in readiness for the tule roof which is to be constructed. It was necessary to rush this before more frost damages the tule.

Truckee-Carson.

Maximum temperature for the week ending Oct. 18 was 77 and the minimum temperature was 23. There was no precipitation during this week.

The workfor the week consisted in the continuance of the leveling of Field B, and the building of the dormitory.

San Antonio.

Maximum temperature for the week ending Oct. 25 was 88.5, and the minimum temperature was 36. There was no precipitation.

The bulk of the farm cotton was sold during the week, two bales being ginned and the balance sold in the seed. The two bales of ginned cotton were classed Low Middling and Strict Low, and were lumped together at 12¢ per pound. The seed cotton sold for 4¢. The Strict Low bale contained some very poor lint and brought a higher price than was expected. Seed cotton picked since the heavy rains of September is selling for about 3¢. This cotton was picked before the rains and was well sheltered. Seed from the ginned cotton was retained for feed.

Picking of Acala on AB8 was completed, as was also corn picking on C5. A small plat of popcorn on D3 was harvested.

1 November, 1913.

FIELD NOTES.

San Antonio (continued)

Cotton stalks on the remainder of the rotation plats were cut, and all but two plats were burned. Cotton stalks were also cut and raked on B4 and C4, and as many as could be cut with the mower were cut on D3. Nine rows remain to be cut by hand. Corn stalks on C4 were cut.

Johnson grass on D5, C6, and A6-10 was cut and raked. Sudan grass on B4-14 was harvested. The yields from this plat were as follows:

1st cutting (June 4).....	1050 lbs.
2nd cutting (July 15).....	784 lbs.
3rd cutting (Oct. 20).....	816 lbs.
Total for the plat.....	2650 lbs.
Total yield per acre.....	5.3 tons.

The orchard on E3, and plats A6-16 and B4-16 were disked.

Messrs. Cook, Kellerman, Swingle, and Gilbert were at the station on the 20th.

Umatilla.

During the week ending Oct. 18 the maximum temperature was 74, minimum temperature 30, and greatest daily range was 36 degrees.

Since the regular fall work was completed Oct. 1 only a small amount of labor has been employed. A man and team worked at regrading the land in Field C4. From blowing and washing while this field was being irrigated it has become quite rough.

During the week ending Oct. 25 the maximum temperature was 77, minimum temperature 32, and greatest daily range 36.

Additional grading was done on Field C4, and the graded portion sown to rye. Rye straw was scattered over the loose land and cut up with a disk to prevent wind erosion.

Director F. H. Newell, of the Reclamation Service and Mr. H. D. Newell, Project Engineer, visited the farm Oct. 25, and went over it to note the development of the various experiments in progress.

1 November, 1913.

FIELD NOTES.

Belle Fourche.

During the week ending October 25, the maximum temperature was 69, minimum temperature 23.

The potatoes have all been harvested, corn husked and fodder hauled in, and the digging of sugar beets completed except AII-14.

The plowing on O and P is very nearly completed. The grain plats in the irrigated rotation are still too wet to plow.

AUTHORIZATIONS.
For Trips to Washington Requested.

Authorizations covering the usual winter trips of the field men to Washington are being requested and will, if approved, be sent out within a short time.

BOOKS.

Farm Superintendents are requested to submit as soon as possible an inventory of all books in their possession June 30, 1913, which have been purchased for field use.

This list, which should be arranged alphabetically by authors, is being called for by the Bureau Library, and its early preparation and submission is desirable.

It is likely that an accounting of books will be asked for annually hereafter, and it is therefore suggested that this inventory be prepared with care and a copy retained at the farm, so that in future it will be necessary only to check the list with the books on hand and add any books received during the year.

8 November, 1913.

FIELD NOTES.

Belle Fourche.

During the week ending November 1, the maximum temperature was 56, minimum temperature 14.

The plowing on Fields O and P has been completed, and plowing on the irrigated rotations commenced.

During the week the irrigated part of Field P was laid out into four series, each series 132 ft. wide, thirteen 10th acre plats to each series, with five ft. alleys and 50 ft. for roads and ditches between series. The ditches for the fall irrigation experiment are completed and water will probably be run during the coming week. The tile for drain ditch on the siphon has been hauled, and the ditch about half completed.

Umatilla.

During the week ending Nov. 1 the maximum temperature was 58, minimum temperature 26, and the greatest daily range 32.

The work of regrading and seeding Field C4 was continued.

A demonstration in pruning and covering Vinifera grapes which was held at the Farm October 29 was attended by forty residents of the Project, and keen interest was shown in the work.

San Antonio.

During the week ending November 1, the maximum temperature was 77.5, and the minimum temperature 29. There was no precipitation.

The first frost of the season occurred on the morning of the 27th, making necessary the immediate cutting of forage sorghum. Sorghum on all the rotation fields and B3 was cut and is about ready to haul in. A part of the sorghum and Johnson grass on D4 was cut. Johnson grass from D5 and C6 was hauled in, a good yield of prime hay being secured.

8 November, 1913.

FIELD NOTES.

San Antonio (continued).

The remainder of the cotton stalks on D3 and those on AB8 were cut and piled; stalks on B4, a part of C4, and the remaining rotation plats were burned. Corn stalks on C5 were cut.

Japanese sugar cane on D3 was cut the latter part of the week. This cane when cut showed no effects of the frosts which occurred earlier in the week.

The following rotation plats were drilled to oats:

A4 6, 14, 17.
A5 2, 5, 10, 14, 18.
A6 6, 7, 9, 11, 15.
B4 19,
B5 7, 8.

A small plat of rye was drilled on C3.

The following plats were plowed:

A5 8, 11, 12, 15, 16, 18.
B4 4, 9, 11, 15, 18.
B5 3, 9, 11.

Johnson grass was weeded out of the orchards on E3 and E4, and a start was made on the rotation plats.

Plats B6-13 and 15 were disked. An attempt was made to disk the roads on the farm but they were too dry and hard.

The rotation plats were measured and stakes reset.

Huntley.

During the week ending Oct. 25, corn husking in Field K was completed, and all of the garden crops harvested. Plowing of plats in Field K is nearly completed. Soil samples for bridging have been taken in Field M-I (Worden).

The alfalfa scalping attachment for the "20th Century Grader", tried recently in the alfalfa eradication experiment in the orchard, has not proved entirely satisfactory. The attachment would perhaps have worked better on a new machine as the one used was loaned by the Reclamation Service, and was rather

Huntley (continued).

badly twisted out of shape. As a result much of the alfalfa was not cut off and the work did not prove as successful as scalping with an ordinary plow. Four horses were used on the machine, but the load was rather heavy, and six horses would likely to required to handle it in a large field, using the same size blade (18 inches).

Beet harvest on the project is much further along than at this time last year, although the recent rains have delayed this work considerably on the heavier soil. Indications are that the yields will be heavier than before, but that the sugar content is considerably lower.

Good yields of potatoes on the project are reported. Potatoes are selling at from 75 to 85 cents per hundred, and a few carloads have been shipped out at this price.

During the early part of the week ending Nov. 1 the ground was too wet for field work, and the men were employed in general repair work about the buildings, grounds, and fences. On Friday and Saturday of this week two teams were kept at work plowing.

Following is a record of the well levels on the Worden tract from July 14 to Nov. 1. These indicate that there has been a marked rise of the ground water during the past six weeks, due to the season's irrigation of higher lands. As yet no work has been done on the proposed drain above this area, and it appears likely that nothing will be done this fall before the ground freezes, in which case it is likely that the ground will be in such condition in the spring that we will be unable to continue the work.

Well Readings-Worden Tract.

Date	Well A-1 Reading	Well A-2 Reading	Well B-1 Reading	Well B-2 Reading.	Average
7/14/13	3.16	3.44	3.51	3.49	3.40
8/ 1/13	3.13	3.38	3.38	3.28	3.29
8/17/13	2.98	2.96	3.46	3.32	3.18
9/ 2/13	3.06	3.31	3.49	3.32	3.29
9/15/13	2.53	2.98	3.04	2.94	2.87
10/ 2/13	1.52	1.94	2.26	2.38	2.02
10/17/13	1.83	2.17	2.51	2.77	2.32
11/ 1/13	1.80	2.15	2.61	2.62	2.29
Total Rise	1.36	1.29	0.90	0.87 ...	1.11

8 November, 1913.

PROTECTION OF CONCRETE STRUCTURES.

In the issue of May 21, 1913, of "Engineering and Contracting" (Chicago), Mr. W. D'Rohan, an irrigation engineer of Denver, contributes an article entitled "The Protection of Concrete Structures from Alkali and Other Destructive Agents". Some points in this paper will interest the field men, particularly in connection with concrete structures used in irrigation. The following excerpts from the article give the author's conclusions as to what are the chief destructive agents, and his method of reducing of preventing the destructive activities.

"In all probability alkali has been made the scapegoat for many failures to which it contributed very little, for as we shall shortly see there are many other causes tending to this destruction. All soft waters, such as rain water and snow water, owing to the presence of considerable carbonic acid, are ruinous to any cement containing lime in any shape or form, the destruction being of course proportional to the lime content of the cement. The carbonic acid leaches out the lime forming calcic bicarbonate, with the result that as soon as the lime content is sufficiently poor the structure fails. This action can be easily seen in sidewalks where the rain water is allowed to fall from the eaves on the concrete. In less than a year the upper skin is abraded, and the concrete soon becomes a mass of gravel. It may be mentioned however that where a top coat of sand and cement is used this destruction is considerably delayed.

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"Now it is a well known fact that all of the western reservoirs and canals are holding and conveying waters impregnated with decaying vegetation and bodies of dead animals, which increase the carbonic acid and bacteria content of the waters and undoubtedly contribute to the destruction of all concrete structures in these waters.

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"Experts are all agreed however that all of the destructive causes of cement, whether arising from sea water, sewage, gases, alkali, and others, are entirely due to their action on the lime, ferric oxide, and alumnia in the cement.

8 November, 1913.

Protection of Concrete Structures (continued).

"In Engineering and Contracting for July 20, 1910, the writer gave a symposium of practices along the same lines all over the world, and quoted the Indian practice of painting concrete with a mixture of two parts boiled linseed oil, with one of raw linseed oil. From experiments made during the last three years, the writer is now convinced that this method is the only one to save existing concrete from alkali, and, indeed, from all other destructive agencies. Mineral oils being subject to softening from the effects of gases are not as successful as vegetative oils. The linseed oil will also, by preventing the oxidation of the sulphides in slag cement, save the latter from decomposition from any source whatever.

"********* It is applied when the concrete is about six months old, in the form of a point (a thin, smooth outer coating), and should be renewed every five years. Formerly, concrete was supposed to need no attention after the forms were removed, but that is a mistake. Concrete while not needing the same attention as wooden structures, nevertheless should be carefully watched, and examined every year".

REQUISITIONS.

For Use in Ordering Supplies for Use at Field Stations.

Mr. Blair has submitted a form of order blank which he desires to use in securing supplies from local dealers, and as it is thought that this form may be found convenient at other farms in keeping a check on supplies purchased it is published herewith. For Mr. Blair's purposes the form is being printed on both heavy and light weight paper, the latter to be used in retaining a copy of the order for the farm files. If other superintendents desire a supply of these order blanks, they may be had upon request.

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U. S. DEPARTMENT OF AGRICULTURE.

Field Station Requisition.

Bureau of Plant Industry. Order No.____

Office of Western Irrigation Agriculture. L.A.No. _____

Field Station - Yuma Experiment Farm, Bard, California.

Point of Delivery _____

Means of Delivery _____

Deliver to _____

Quantity	Firm Mark	Article	Unit	Unit Price	Amount

Please furnish the articles named above in good order and condition, delivered as specified.

Signed:

_____
Farm Superintendent,
In Charge, Yuma Experiment Farm.

Date:_____191__.

Addressed to _____

_____

8 November, 1913.

FIELD NOTES.

Scottsbluff.

During the week ending Nov. 1, the last of the third cutting of hay was put up, and although this hay was out several weeks it was in good shape when it was put in the stack.

The hog house is almost completed. It is hoped to put this house to use the coming week.

The work of crowning and plowing under the alfalfa in the experiment of "Extermination of alfalfa", as outlined, has been completed except for the plats that will be crowned next spring.

The crowning attachment that was purchased for the 20th Century Grader did very good work. There was difficulty in preventing skips as there is no way in seeing where the machine went on the previous round, but this is not a serious problem.

The attachment cost $13.50 f.o.b. Mitchell. If a similar attachment could be adapted to something less expensive than a grader, which costs $125, it would be a good machine for the farmers. The draft is much lighter than was expected; three horses would pull the machine very easily. The alfalfa on which the cutter was used was over three years old, and many of the roots were very heavy.

The outline of the experiment called for the harrowing of the crowned alfalfa. This is not a good plan as it has a tendency to bunch the stubble. It was also found that where the soil was moist the crowns were not cut as well as where the soil was dryer.

This implement has given such satisfaction that it is planned to crown next year's potato land with it this fall.

8 November, 1913.

FIELD NOTES.

Scottsbluff (continued).

The following are the yields on the Rotation plats:

Rot.	Series	Plat	1 st. cutting	2 nd. cutting	3 rd. cutting	Total yield
65	I	8	1.6	1.94	1.45#	4.99
65	I	9	2.08	2.24	1.5	5.82
61	II	8			1.38*	1.38
61	II	9	1.75	2.14	1.52	5.41
61	II	10	1.91	2.14	1.48	5.53
40	II	13			1.28*	1.28
40	II	14	1.80	2.35	1.48	5.63
60	III	8			1.3*	1.3
60	III	9	1.46	2.05	1.5	5.01
60	III	10	1.74	2.32	1.48	5.54
42	III	13			1.2*	
42	III	14	1.96	2.07	1.34	5.37
62	IV	8			1.19*	1.19
62	IV	9	1.82	2.02	1.46	5.30
62	IV	10	1.69	2.01	1.4	5.1
44	IV	13	.70	1.64	1.24#	3.58
44	IV	14	2.02	2.37	1.48	5.87
8	V	1	1.98	2.04	1.36	5.38
48	V	13	.62	1.75	1.28	3.65
48	V	14	1.98	2.19	1.4	5.57#

* Spring seeded. - 1913
\# Fall seeded - 1912

	Max.	Mean	Min.
1912 - Fall Seeded	4.99	4.07	3.58
1912 - Spring seeded	5.87	5.46	5.01
1913 - Spring Seeded	1.38	1.27	1.19

8 November, 1913.

FIELD NOTES.

Truckee-Carson.

During the week ending Nov. 1, the maximum temperature was 75, minimum temperature 26; there was no precipitation.

Work was begun clearing and grading C drain to the lowest possible level permitted by the drainage system of the Reclamation Service.

Weeds were cleared from Field Y and everything made ready for plowing and releveling of this series.

Yuma.

During the week ending Oct. 25, the maximum temperature was 95, minimum temperature 46, and greatest daily range 48.

Picking of Egyptian cotton continued steadily throughout the week. The bulk of other labor was engaged in cutting and thatching tule for the roof of the bunk house now under construction. The roof was completed and the remainder of the construction work will be postponed until cotton ginning is completed.

Leveling continues on raw lands B 13 to 17. Borders B 18 to 22 were disced, leveled and prepared for alfalfa plantings. The raw land lying south of dates, Border 21 on "A" series, was cleared of arrow weed and willow second growth, in preparation for leveling. This tract includes an old slough containing much alkali. Through the Reclamation Service a cooperative experiment is to be established on ths ground to test certain concrete mixtures in relation to alkalis by the use of concrete drain tiles. Dates will be planted here next season.

Live Stock on the Yuma Project.

The following note appeared in the "Yuma Sun", of October 31.

"Harvey Abbot yesterday brought in a carload of dairy cows from Monterey County, California, for his ranch a

Live Stock on the Yuma Project (continued).

couple of miles below Somerton. This brings the number of Mr. Abbot's dairy herd to 100.

Another increase made yesterday to the number of cattle in Yuma valley was 300 range cattle brought in by E. G. Caruthers from northern Arizona.

There are now something over 4,000 head of cattle in the valley below Yuma. Nearly half of this number has been brought in within the last two months".

PERSONAL

Mr. Farrell leaves Washington on the afternoon of November 8 for Salt Lake City, Utah, where he will attend, as a representative of the Bureau of Plant Industry, the "Operation and Maintenance Conference" to be held in that city beginning Nov. 12. This conference is being conducted by officials of the U. S. Reclamation Service. Mr. Farrell expects to return to Washington on the 21st. of November.

15 November, 1913.

IRRIGATION BY PUMPING IN THE LOWER SNAKE RIVER VALLEY.

The use of pumping plants in irrigation in the West is being very rapidly extended in certain localities, and the existence of large and small tracts of excellent land at elevations too high to be served by economically feasible gravity systems has created a good deal of interest in the possibilities of pumping. The development of hydro-electric power in many of the irrigated districts has lent impetus to the pump-irrigation movement, and it seems probable that there will be large extensions in pumping enterprises during the next few years.

On his last field trip the writer visited a number of pumping plants in southwestern Idaho and eastern Oregon, in company with Mr. Don H. Bark, of Irrigation Investigations, Office of Experiment Stations. Mr. Bark is making a detailed investigation of about 25 pumping plants located in Canyon and Washington counties in Idaho and Malheur county in Oregon. His investigation will include the cost of power, crops irrigated, the capacity of pumps, installation and operation, quantity of water used, and a number of other points of practical importance. Through Mr. Bark's kindness it is possible to present here a few facts concerning prospective developments in that region. This information should be regarded as confidential, since Mr. Bark expects to publish his results when his investigations are completed.

The land being served by these pumping plants lies on both sides of the Snake River in Idaho and Oregon, extending from near the town of Parma, Idaho, for a distance of about 40 miles down the river. The soil and climate of that locality are generally favorable to the production of orchard fruits and to other lines of intensive agriculture.

Irrigation by Pumping (continued).

There are a number of different types of pumping plant. The most common type uses electric power; several use gasoline or distillate, and still others use old-fashioned water wheels. One power company is furnishing electricity for 163 plants, the size of plant varying from 1/2 horse power motors to a system which develops 1,150 horse power. The lifts vary from about 5 feet to 131 feet.

The total area to be irrigated by the pumping systems now in operation in the district is reported to be approximately 60,000 acres. The 163 electric pumping plants mentioned above are equipped to irrigate about 50,000 acres; and the numerous gasoline, ditillate, and water wheel plants will probably serve in the neighborhood of 10,000 acres when they are run at their full capacity. The size of the tracts irrigated vary from 10 acres to 7,000 acres. The smaller tracts are owned and irrigated by individuals; the larger plants are operated principally by associations of landholders who are organized, under State laws, into irrigation districts. Under the latter arrangement, the cost of operation is distributed over the entire acreage, unused land paying at the same rate as the land actually irrigated.

Most of the water is pumped from the Snake River direct or from canals diverted from that stream which are used primarily in gravity systems. A few small plants pump water from shallow wells.

There are various methods used in selling electric power to the irrigators, but the two chief methods are as follows: (1) The company charges $10 per horse power for the season, plus 2 cents per killowatt-hour for the current used, a minimum price of $100 a season per plant being charged. (2) A flat rate of $28 a horse power for the season is charged with no stipulated minimum charge. The second method is used on the larger plants. There are numerous modifications of both the above methods, but these

Irrigation by Pumping (continued).

two are much the most common.

It was not possible to obtain any definite figures on the cost of operating these pumping plants. Some figures were secured which indicate the cost per acre per season when the cost was distributed over the entire acreage — irrigated and non-irrigated — of an enterprise; and some other figures of a general nature were obtained.

One plant near Payette, Idaho, is prepared to furnish water to 2,000 acres. The lift is 131 feet. The land is planted mainly to orchard trees. The landowners paid $7.50 an acre, flat rate, for the water used in 1913. This included the price paid the canal company for the water (which price was not ascertained) as well as the cost of pumping and distribution. About 2 acre-feet were used per acre. A plant on the Oregon side opposite Payette furnishes water for 7,000 acres. There are three lifts, the highest of which is 104 feet. This plant is controlled by an irrigation district organization, and the cost of water is distributed over the entire acreage. This cost in 1912 was $4.59 per acre. The extent of the acreage actually irrigated could not be learned. Another plant lifted water 100 feet for a 2,000-acre tract in 1912 at a cost of $3.90 an acre for electric power. All the tract was not irrigated, and it was not possible to learn, at the time of the visit, how much water was actually delivered.

A small plant near Payette uses a 5 h. p. motor and pumps water for 70 acres of orchard. The lift is 16 feet. About 2.5 acre-feet of water is used each year and the cost, for power, is about 3.5 cents per acre-foot per foot of lift. The expenses of water delivery on these various tracts in addition to the power cost are probably small, relatively, as most of the land is so near the source of water that

Irrigation by Pumping (continued).

the cost of ditch maintenance is light, and the cost of equipment is relatively small when the acreage is considered.

The table below contains some figures, furnished by Mr. Bark, on the costs, for power only, for the month of May, 1913, for plants with various lifts.

Designation.	Feet.	Acre-feet of water used.	Power cost per acre-foot per foot lift.
A	6.90	32.0	$0.1390
B	7.12	36.0	0.0547
C	8.78	28.0	0.0440
D	19.68	199.0	0.0430
E	22.30	9.0	0.0900
F	27.23	2.5	0.2400
G	56.68	181.0	0.0190
H	131.16	311.0	0.0220

These figures are not intended to serve as anything more than a suggestion. They were obtained in May — the early part of the irrigation season — when some of the plants were operated for the first time. Doubtless some changes will be found in the cost per foot-acre-foot when the results for the entire season are available.

While the above data are indefinite and incomplete, the facts given indicate in a general way the status of pump-irrigation in the district in question. It seems likely that pumping will prove practicable in that district and in many others similarly situated with respect to the water supply. One of the striking features about the pumping plants visited, particularly those using electric power, is

Irrigation by Pumping (continued).

their wide adaptability with respect to acreage served. Equipment using motors as small as 1/2 horse power can be employed, and the size of the equipment can easily be increased to suit the requirements of almost any pumping enterprise. The smaller plants require no continuous attention, and even the largest plants require only one or two men regularly. Another advantage of pumping is that it is not necessary to build and maintain elaborate canal systems and reservoirs.

These advantages, together with the present and prospective development of hydro-electric power in the irrigated districts and the relatively low prices at which this power may be purchased, seem to promise that the practice of irrigation by pumping will be widely extended in western localities where soil, climatic and market conditions are reasonably favorable to intensive agriculture.

F. D. F.

FIELD NOTES.

Scottsbluff.

Mr. Holden reports the following corn yields on the rotation plats:

Plat No.	Rotation No.	Bus. per acre.
I - 18	6	43.7
II - 1	26	67.6
IV - 2	16	69.2
IV - 5	32	68.4
IV - 11	62	82.6

The corn was dry and well matured.

15 November, 1913.

FIELD NOTES.

San Antonio.

During the week ending November 8, the maximum temperature was 83.5, minimum temperature 34, and precipitation .42 inch. Threatening weather prevailed during the early part of the week.

The remaining cotton stalks on D3, B4, C4, and AB8 were burned, and B4 was plowed. Johnson grass was cut on the rotation plats, waste land between the tanks, and around the flume. The unfavorable weather during the early part of the week was taken advantage of in grinding the milo, which was being damaged by weevils, and in cleaning up the machine sheds and grounds. The farm roads were disked; also, the following plats:

A5 - 6. 7. 9. 13 and 17.

Scottsbluff.

During the week ending November 8, the weather was warm and fair, but with the exception of a few hours during the forenoon of each day, very little outside work could be done owing to severe wind storms which occurred throughout the week.

All of the hog yards which were under construction are now completed, and pigs are now being fed. Many of the farmers in this vicinity have lost all of their hogs from cholera, and those who did not suffer entire loss have sold even the brood sows, fearing that cholera may strike them.

Breaking the alfalfa sod in Field K was begun during the week, and upon the completion of this work, an alfalfa crowner will be used in Field I where it is intended to place a portion of the potato experiments in 1914.

15 November, 1913.

FIELD NOTES.

Umatilla.

During the week ending November 8 the maximum temperature was 61, minimum temperature 31, and greatest daily range 22.

The week was devoted to miscellaneous work about the farm and grounds.

The dairy and hog show which was held at Hermiston, Saturday, Nov. 8, was a great success. Over 65 dairy animals ranging from calves to mature cows were exhibited in 17 classes, which allowed different classes for registered holstein and jersey cattle. Some very good animals were exhibited, and the interest was very keen. It was one of the most enthusiastic stock shows that has ever been held in eastern Oregon. Some animals were brought a distance of fifteen miles to the show. In compliance with a state law, all animals had to be tested for tuberculosis before they were exhibited. The Umatilla Deputy Stock Inspector tested over 60 head, of which only one gave a tubercular reaction.

The hogs exhibited were very good, and the 12 classes all had entries and competition.

The effect of this show is being keenly felt, and is creating renewed interest in high grade stock.

22 November, 1913.

FIELD NOTES.

Huntley.

During the week ending November 8, fall plowing in Field K was completed. Plowing of oat stubble in Field C was commenced. The fore part of the week was spent in repairing fences.

Yields of Corn on Field K.

Rot. No.	Plat No.	Stand Acre	Height	Date Harvested	Yield Lbs. Fodder	Yield Lbs. Grain	Yield Bus. Acre
32-C	K IV-20	7372	7 ft.	9/25/13	880	877	48.7
6-cc	K IV-23	7256	6 ft.	9/25/13	650	661	36.7
16-B	K V-2	7088	6 ft.	9/25/13	900	611	33.9
26-A	K V-11	7592	7 ft.	9/25/13	1040	873	48.5
		Average...		.....	867	755	41.9

At the time of the first frost September 19, only about two-thirds of the corn in these plats was matured. This is largely due to the fact that part of the corn did not come up until after the first irrigation on June 14.

Yields of Flax on Field K.

Rot. No.	Plat No	Stand Acre	Height	Date Harvested	Yield Lbs. Fodder	Yield Lbs. Grain	Yield Bus. Acre
67-A	K II-4	1899	26 in.	8/12/13	757	438	31.28
9-cc	KIII-16	1132	24 in.	8/12/13	280	170	12.14
		Average..		.....	518	304	21.71

22 November, 1913.

FIELD NOTES.

Scottsbluff.

The greater part of the week ending November 15 was devoted to grading about the buildings. The road about the buildings, as originally laid out, was never put in shape except for the grading that was done on it. This road was plowed and then scraped out, placing it a trifle lower than the surrounding grounds.

Some more hog yards were made; with these new yards ample yardage for the hogs is provided, and it will not be necessary to put them in the corral this winter with the horses.

The pig feeding work is well under way, and all of the pens are doing well. The object of the feeding is to determine the value of the feed as the farmers on the project can grow it. The pens are numbered and fed as follows:

Pen No. 1. Corn and molasses (molasses from the Sugar Factory).
Pen No. 2. Barley (hulled) and molasses.
Pen No. 3. Barley (hulled) and cull potatoes (potatoes boiled).
Pen No. 4 Barley (hulled).
Pen No. 5 Hulless barley.

This being the first experiment in feeding potatoes and molasses, some very interesting information in regard to these feeds is being obtained.

A tabulated statement of the results to date will be included in the next report.

The corn yields on Field K were as follows:

Series No.	Plat No.	Rotation	Bushel per acre.
I	18	6	43.7
II	1	26	67.6
IV	2	16	69.2
IV	5	32	68.4
IV	11	62	82.6
		Average.....	66.3

22 November, 1913.

FIELD NOTES.

Belle Fourche.

During the week ending November 8, the maximum temperature was 64, and the minimum temperature 14.

Results of Dynamiting Test.

On Oct. 12, 1912, a representative of the Du-Pont Powder Company called at the Station and gave a demonstration in blasting soil for field crops. The demonstration was conducted on Plat B VIII-1. This plat in 1910 was seeded to oats, summer fallowed in 1911, and planted to millet in 1912. B VII-1 and B IX-1 were used as checks. Plat B VII-1 was treated the same as B VIII-1 previous to the blasting. Plat B IX-1 was manured in the fall of 1910 at the rate of 20 tons to the acre, and in 1911 and 1912 planted to oats. All three of the 1/10 acre plats were plowed Sept. 20, 1912. Twenty per cent dynamite was used, the shots being placed 20 ft. apart, 8 holes to a plat. The holes were 3 feet deep, and one-half pound dynamite was used for each shot. The cost of this operation, including dynamite, fuse, caps and labor was $12.00 per acre. In the spring of 1913 all three plats were treated alike and seeded to Sixty Day Oats with the following results:

Plat	Bushels per acre.
B VII-1	25.9
B VIII-1 (dynamited).....	18.4
B IX-1.....	24.5

The average of all the dry land oat plats in the field was 24.5 bushels per acre. The crop conditions were favorable up to July 1, but after that all crops suffered for lack of moisture.

22 November, 1913.

FIELD NOTES.

Belle Fourche (continued).

The plowing of irrigated rotations was completed during the week. The garden was manured and partly plowed.

Two samples of sugar beets were sent to the Scottsbluff Sugar Factory for analysis, one sample from an irrigated rotation plat (A I-30), and one from A III-30, with the following results:

	Sugar	Purity	Average weight.
A III-30 ..	19.9%	90.2%	17 oz.
A I-30 ..	18.3%	85.4%	18 oz.

A III-30 was planted from seed furnished by Prof. Shepard, of the South Dakota Agricultural College, and A I-30 was planted from seed furnished by the Scottsbluff Sugar Factory, which was a mixture of three different strains of Kleinwanzleben.

Following is the yield of sugar beets in the irrigated rotations:

Plat No.	Rotation No.	Yield
AI-1	40	8.524 tons.
AI-5	42	8.748 "
AI-10	60	8.0 "
AI-20	31	9.328 "
AI-24	18	7.868 "
AI-26	20	10.726 "
AI-28	21	8.820 "
AI-30	22	7.640 "
AI-32	23	8.312 "
AI-45	2	4.788 "
AII-8	62	7.012 "
AII-14	61	6.068 "
AII-24	66	5.560 "
AIII-11	32	6.544 "
AI-17	30	9.052 "
	Average.....	7.799 Tons

22 November, 1913.

FIELD NOTES.

Belle Fourche (continued).

Following is the yield of potatoes in the irrigated rotations:

Plat No.	Rotation No.	Yield.
AI-4	40	88.0 bus.
AI-14	60	97.33 "
AI-18	30	74.33 "
AI-21	31	90.0 "
AI-27	20	128.0 "
AI-29	21	133.33 "
AI-35	24	109.33 "
AI-37	25	95.33 "
AI-39	26	120.66 "
AI-41	27	114.66 "
AI-47	4	96.0 "
AII-18	61	139.33 "
AIII-22	44	176.66 "
	Average.....	112.53

Following is the yield of corn in the irrigated rotations:

Plat No.	Rotation No.	Yield.
AI-23	16	33.11 bus.
AI-38	36	21.66 "
AI-49	6	39.44 "
AII-12	62	32.22 "
AII-27	66	43.00 "
AIII-18	65	(Hogged-140# pork)
AIII-12	32	34.80 bus.
	Average of 6 plats	34.06 bus.

During the week ending November 15, the maximum temperature was 62, and the minimum temperature was 18.

22 November, 1913.

FIELD NOTES.

Belle Fourche (continued).

The discing of the fall plowed plats in the irrigated rotations has been completed. The garden was plowed and manured. The manuring of the plats in AII 37 — 46 is partly completed.

Series II and IV in Field P for the fall irrigation experiment was irrigated during the week. The ground was plowed previous to the irrigation, and it seems to take up an unusual amount of water.

Truckee-Carson.

During the week ending November 8, the maximum temperature was 70, minimum temperature was 21, and precipitation .13 inches.

The work of plowing and leveling Field Y was begun in preparation for the series of experiments in reclaiming this land which contains black alkali and other salts, and is not at present suitable for the growing of crops. A carload of drain tile has arrived to be used in this connection.

Results of experiment to determine effect of frequency of irrigation on the growth of alfalfa.

Cylinders of galvanized iron, 30 inches long and 16 inches in diameter were driven to a depth of 24 inches in the soil in a portion of a field of alfalfa having a uniform stand. The experiment was carried on in duplicate. Irrigation water was added to the cylinders to a depth of three inches (19 pounds to a cylinder) at intervals of time as shown in the table below. The dates of irrigation, planned, were as follows:

No. 1. April 15-22-29. May 6-13-20-27. June 3-10-17-24. July 1-8-15-22-29. August 5-12-19-26. September 2-9-16-23-30.

22 November, 1913.

FIELD NOTES.

Truckee-Carson (continued).

No. 2. April 15-29. May 13-27. June 10-24. July 8-22. August 5-19. September 16-30.

No. 3. April 22. May 13. June 3-24. July 15. August 5-26. September 16.

No. 4. April 29. May 27. June 24. July 23. August 19. September 16.

No. 5. May 6. June 10. July 15. August 19. September 23.

No. 6. May 13 June 24. August 5. September 16.

This schedule was followed except from June 17 to July 8, inclusive, when the man who did the watering irrigated all cylinders every week. This was during Mr. Headley's illness, and occurred owing to a misunderstanding of the instructions.

It probably accounts for the fact that no practical difference was obtained in the yields of the cylinders for the first cutting.

Alfalfa in Cylinder No. 3, of Series I, made a smaller growth than that in the other cylinders, causing a somewhat irregular curve when the results are platted. This lesser growth, in this cylinder, is apparently due to some unfavorable soil conditions.

The yields given below represent the green weight of the alfalfa immediately after cutting.

Frequency of Irrigation, Weeks.	Green weight in grams. Series I	Series II	Average
1	250	330	290
2	200	315	258
3	125	275	200
4	225	240	233
5	210	225	218
6	210	275	243

Cut July 11, 1913.

22 November, 1913.

FIELD NOTES.

Truckee-Carson (continued).

Frequency of Irrigation, Weeks.	Green weight in grams. Series I	Series II	Average.
1	210	250	230
2	112	203	158
3	70	172	121
4	79	97	88
5	162	122	132
6	85	53	69

Cut August 20, 1913.

Frequency of Irrigation, Weeks.	Green weight in grams. Series I	Series II	Average.
1	135	140	138
2	85	108	97
3	65	90	78
4	80	85	83
5	80	65	73
6	50	65	58

Cut October 6, 1913.

Summary.

	Third Cuttings	Second and Third Cuttings.
1	658	368
2	513	255
3	399	199
4	404	171
5	423	205
6	370	127

Experiment to determine the influence of time of cutting on the yield of alfalfa.

Fifteen galvanized iron bands were secured and placed in a field of alfalfa where the growth appeared

22 November, 1913.

FIELD NOTES.

Time of Cutting Experiment (continued).

uniform. Five series were run in triplicate.

First Cutting.

Series 1 was cut June 2, at the appearance of the first bloom, and the remaining series at 1, 2, 3 and 4 weeks thereafter. Series 3 was cut at about the normal stage for cutting alfalfa while Series 4 and 5 were rather well matured.

Second Cutting.

Series 1 was cut July 16, at the appearance of the first blooms, and the remaining series at 2, 4, 6 and 8 weeks thereafter. Series 3 was cut at about the normal stage.

Third Cutting.

The third cutting was made October 6 for Series 1, 2 and 3. Series 4 and 5 were too short to cut but Series 4 had sufficient growth to have afforded pasturage for stock. If the pasturage value of Series 4 were counted, its total yield for the year would probably be slightly higher than Series 5.

The results of the season's work are given below:

Table showing yield of alfalfa at different stages of maturity.

	Dry Weight in Grams.			
Date Cut.	Plot "A"	Plot "B"	Plot "C"	Total
Series No. 1.				
June 2	350	350	457	1157
July 16	260	300	325	885
Oct. 6	110	255	195	560
Total.....	720	905	977	2602

22 November, 1913.

FIELD NOTES.

Time of Cutting Experiment (continued).

Date Cut.	Dry Weight in Grams. Plot "A"	Plot "B"	Plot "C"	Total
Series No. 2.				
June 9	400	400	425	1225
July 30	275	275	275	825
Oct. 6	150	210	140	500
Total	825	885	840	2550
Series No. 3.				
June 18	494	542	499	1535
Aug. 13	210	310	290	810
Oct. 6	80	130	120	330
Total	784	982	909	2675
Series No. 4.				
June 24	500	575	450	1525
Aug. 29	200	250	350	800
Oct. 6	---	---	---	---
Total	700	835	800	2335
Series No. 5.				
July 5	500	725	550	1775
Sept. 11	175	250	220	645
Oct. 6	---	---	---	---
Total	675	975	770	2420

SUMMARY OF TOTALS.

Series No.	1 - 3	Cuttings	2602	
" "	3 - 3	"	2550	
" "	3 - 3	"	2675	
" "	4 - 2	"	2335	and pasture growth.
" "	5 - 2	"	2420	

The results of the experiment indicate that the increased yield obtained from making three cuttings per year is not sufficiently great to pay for the added expense of making the third cutting. However, these results might have been different had there been sufficient water for irrigation during the latter half

22 November, 1913.

FIELD NOTES.

Time of Cutting Experiment (continued).

of the season. If the field had had a normal amount of irrigation water the yields would undoubtedly have been greater and the ratio between the yields of the different series might have been different.

Dairy Cow Payments.

The following extracts from a letter written by Mr. Heisey explain the methods to be followed in securing payment for the cows purchased by the farmers from the Wingfield shipment reported in the Weekly Bulletin of November 1, 1913.

"It is too early to make a definite statement regarding the results obtained from the cows of our first shipment.

The farmers seem satisfied.

Each cow purchased by us is numbered, the number recorded and her record as a producer.

From this record we get the cow's value and sell her at a fixed price, on our terms; that is, no money down, but the creamery takes one-half the cream check each month with the understanding that no payment is to be less than $2.50 per month per cow, with interest at 8% on deferred payments.

The price to the farmer on the first shipment ranged from $75.00 to $145.00 with an average of about $105.00 per cow.

The number of cows for dairy purposes sold to farmers run from three to ten with an average of probably six cows per farmer."

San Antonio.

The maximum temperature for the week ending November 15 was 81, minimum 37, and greatest daily range 40.

22 November, 1913.

FIELD NOTES.

San Antonio (continued).

Plats A4-1 and A6-3 were plowed. The remainder of Field C5 was plowed and plowing of Field C4 was started. Plats on which oats were grown last year were disked for the purpose of killing the volunteer oats. Canada field peas were planted on B3 for seed purposes, and several varieties were planted on C3 for testing as to hardiness and productiveness.

The following table gives the results of the variety test of cotton. This cotton was grown without irrigation. These yields are the summary of individual rows 264 feet long and grown in three series.

Variety Test.
SHORT STAPLE COTTONS.
S. A. Experiment Farm.

Variety	STAND		YIELD	
	No. of plants	Percentage	seed cotton, pounds Per row	Per acre
S. A. 1000	163	100	13.6	544
S. A. 920	150	92	12.4	496
S. A. 917	143	88	12.4	496
Rowden	140	86	12.3	492
Roundnose	147	90	12.0	480
Trook	149	91	11.6	464
Lone Star	147	90	10.8	432
Boudurant	148	91	10.4	416
Triumph, San Saba	149	91	10.2	408
Lanquin	150	92	9.8	392
Acala	159	97	8.7	348
Durango	162	99	8.4	336

The results from the long staple cotton test are given in the following table. This block received one light irrigation at the time of planting, but was not irrigated after this because of the boll weevil. These

22 November, 1913.

FIELD NOTES.

San Antonio (continued).

yields also are the summary of individual rows 264 feet long grown in three series.

Variety Test
LONG STAPLE COTTONS
S. A. Experiment Farm.

Variety	Average Yield, Seed Cotton. Pounds per row	Pounds per acre
Hartsville	13.43	537.2
Columbia	11.7	468.0
Durango	11.6	464.0
Snowflake	10.8	432.0
Blackseed	10.6	424.0
Webber, L.S.	10.0	400.0
Foster	9.93	397.2
Moynards	9.47	378.8
Webber	8.23	329.2
Keenan	7.8	312.0

Variety Test
CORN
S. A. Experiment Farm.

Variety	STAND No. of plants	STAND Percentage	YIELD Bushels per acre.
Chisholm	4510	85.6	32.9
Surcropper	4370	82.9	31.3
Laguna	5010	95.1	36.0
Ferguson's Y D	4840	91.6	34.5
Evins	4890	92.6	31.6
Lamm	5170	98.1	31.3
Average			31.3

22 November, 1913.

FIELD NOTES.

San Antonio (continued).

Mr. W. E. Townsend arrived at the station on the 13th of November.

Mr. Hastings returned to the station on the 12th of November.

Yuma.

During the week ending November 1, the maximum temperature was 93, minimum temperature 43, and greatest daily range 47.

Cotton picking continues, and team work of leveling on B Series, 13 to 16, inclusive, continued.

More grain sorghum varieties were harvested from C 37 and 38. Barn lot manure was hauled to sandy portions of alfalfa fields B-9 to 12 in preparation for turning this crop under. These fields will likely be reseeded to alfalfa in the spring, to be used for pasture.

Three hundred and fifty cuttings of Elaegnus angustifolia were made and placed in nursery rows on $A\text{-}10_1$ for rooting. These plants will be utilized in the windbreak for the deciduous orchard on B-25.

Cowpeas grown on the various borders during the present season were for a green manure crop only with the exception of the several late plantings that are not yet turned under, which may mature a supply of seed unless killing frosts occur early. Borders B-18 to 24, inclusive, $A\text{-}14_{7\&8}$ and $A\text{-}15_2$ were all new land, leveling being completed too late in the season for the spring seeding of alfalfa and cowpeas were seeded as follows: B-18 to 24, July 12; $A\text{-}14_{7\&8}$, July 18; and $A\text{-}15_2$, July 25. All these fields were originally very rough which necessitated much moving of surface soil, and leaving many originally high spots

22 November, 1913.

FIELD NOTES.

Yuma (continued)

with an open sand at the surface with little surface soil intermingled. These places were badly in need of humus before a successful seeding of any crop could be made. Generally, the cowpeas grew well while in the heavier soils the growth was extremely vigorous. The variety "Whippoorwill" was used, seeded with a 7-inch grain drill at the rate of 30 pounds per acre. The dates of turning under were as follows:

B-18 to 24.....	October 8
A-14 (7&8).....	" 16
A-15 2	" 16

The growth ranged from 15 inches in height on the sandy soil to 27 inches on the silt soils. An estimate of green plant yield returned to the soil averaged about alike on all plats, namely, 3.9 tons to the acre, or equalling after 6 days air drying, 2.1 tons per acre. This growth was made in 12 weeks time with approximately two acre-feet of water in five and six applications.

Whippoorwill cowpeas were also seeded to sandy fig lands C-6 to 11, inclusive, on July 24th, in like manner, and turned under October 4th. It seems that if cowpeas are to be used to improve new fig land in this locality they should be seeded earlier, so that the desired growth would be produced before water should be shut off fig trees. This should be about September 20th to allow succulent growth of tree to ripen before going through the frost of winter.

During the week ending November 8, the maximum temperature was 89, minimum temperature 40, and greatest daily range 46.

Hay was harvested from Peruvian alfalfa borders C-39 and 40. Alfalfa on borders A-6 to 9, B-9 to 12, B-31 & 32, C-6 & 7, and D-6 to 16 will be plowed under as green manure when the last crop is sufficiently developed. Row alfalfa plantings D-42 to 45 were irrigated and cultivated.

22 November, 1913.

FIELD NOTES.

Yuma (continued).

The last crop of Tunis grass has been harvested. This crop was planted May 14, 1913. The following table indicates the yields of all plantings of this grass.

Plat No.	Method of Seeding	Area, acres	1st. Crop date	1st. Crop Pounds per plat	2nd. Crop date	2nd. Crop Pounds per plat	3rd. Crop date	3rd. Crop Pounds per plat	Total Tons per acre
A10-2	3ft. rows	.096	7/21	150	8/29	280	10/25	378	4.21
D-38	Broadcast	.157	9/27	680	----	---	-----	---	2.17
D-41	7"drills	.076	7/25	170	11/7	170	-----	---	2.22

Plat $A-10_2$ was on a sandy loam soil and received eight irrigations with a cultivation following each. D-41 was seeded with a seven-inch drill on a heavy silt soil with a fine sand subsoil at about 18 inches. It was irrigated eight times. Plat D-38 was a broadcast planting seeded at the rate of 20 pounds per acre, to be left to shatter and reseed to demonstrate its worth as an annual pasture grass. This planting was irrigated six times.

Tunis grass hay harvested at proper maturity was eaten greedily by horses and mules.

Roses in front grounds have been transplanted to a new bed to provide for the rearranging of ground walks.

The farm cotton gin was started Saturday. After two days' gining of the Farm Egyptian cotton, ginning of the settlers' crop will be begun.

Mr. McLachlan spent three days at the Station during the week.

22 November, 1913.

FIELD NOTES.

Yuma (continued).

Water Table and Total Salt Content, on November 3, 1913.

Well No.	Depth of Water Table, Ft.	Total salts p.p.100,000
1	9.65	64
2	6.52	69
3	7.9	57
4	5.95	91
5	7.05	59
6	3.75	57
7	9.4	65
8	9.05	33

29 November, 1913.

FIELD NOTES.

Huntley

Weather conditions are continuing unusually favorable, and beet harvest on the Project is nearly completed.

Plowing of Fields C, BV and BVI was completed. Water levels on the Worden Tract on November 15 are given below, in comparison with those on November 1.

Well No.	Reading Nov. 15.	Reading Nov. 1.	Fall since Nov. 1.
A-1	2.02	1.80	.22
A-2	2.35	2.15	.20
B-1	2.73	2.61	.12
B-2	2.68	2.62	.06
	2.89	2.59	.15

Pasture Grass Test.

As stated in the Weekly Bulletin of May 10, 1913, a test of several pasture grasses and grass mixtures was started at Huntley last spring. The first year's work consisted in starting three grass mixtures and eleven separate grasses. Mixture "A" consisted of the following grasses planted at the rates in pounds per acre indicated in parentheses after the names of the grasses:

Timothy (4)	Red top (4)
Kentucky blue grass (4)	Orchard grass (6)
Bromus inermis (2)	Meadow fescue (2)
Tall fescue (2)	Italian rye grass (2)
Western wheat grass (6)	Perennial rye grass (2)
Tall oat grass (2)	

29 November, 1913.

FIELD NOTES.

Huntley (Pasture Grass Test — continued).

Mixture "B" is the same as "A", except that it contains white clover (2) and alsike clover (2). Mixture "C" is identical with "B" except that it contains alfalfa (2).

The seed was planted April 21-23 in Field AII. The preceding crops and the methods of soil preparation were as follows:

Plats AII-1 and 2 were planted to flax in 1912, and grass in 1911. Plats AII-10 and 11 were planted to flax in 1912, and to sorghum in 1911. Plat AII-12 was planted to flax in 1912, and corn in 1911. Plat AII-13 was planted to corn in 1912, and beets in 1911. Plats in flax in 1912 were prepared by plowing 8 inches deep in the fall of 1912, and by double discing, harrowing, and leveling immediately before seeding. Plats in corn in 1912 were prepared by double discing, harrowing, and leveling immediately before seeding. All seeding was done with a Superior double disc drill. Plats planted to grass mixtures are quarter-acre, and plats planted to separate grasses are twentieth-acre in size. Plats AII-1 and 2 are on very heavy ground, and the stand of grass at first was so poor and so badly infested with weeds that it was thought best at first to plow it up. It was decided later to leave it, and the stand has thickened considerably. It was not possible to make accurate stand counts, so they are not given. The following plats failed to make a stand, and were plowed up:

AII-11a (timothy) : AII-11b (Kentucky blue grass) : AII-12a (red top) : AII-12c (Western wheat grass).

The results obtained in 1913 with the mixtures and separate grasses are given below, the stands being expressed in thousand plants per acre, and the heights

29 November, 1913.

FIELD NOTES.

Huntley (Pasture Grass Test — continued).

having been determined at the time of harvest.

Plat	Crop	Stand	Height, inches	No. of irrigations	Harvested	Yield acres, Tons.
AII-1	Mix. "A"	---	8	1	7/12	0.54
			18	1	9/17	0.18
						0.72
AII-2	Mix. "B"	---	8	1	7/12	0.72
			20	1	9/17	0.38
						1.10
AII-10	Mix. "C"	361	--	1	7/29	0.63
			18	1	9/17	1.18
						1.81
AII-11a	Timothy	Failed				
AII-11b	Kentucky blue grass	Failed				
AII-11c	Tall fescue	570	34	2	9/17	0.70
AII-11d	Italian rye grass	787	22	2	9/17	0.60
AII-12a	Red top	Failed				
AII-12b	Orchard grass	252	14	2	9/17	0.25
AII-12c	Western wheat grass	Failed				
AII-12d	Perennial rye grass	713	7	2	(Not cut)	
AII-13a	Bromus inermis	401	28	2	9/17	0.95
AII-13b	Meadow fescue	792	11	2	9/17	1.05
AII-13c	Tall oat grass	659	21	3	8/20	0.90
AII-13d	Orchard grass	---	13	4	9/17	0.35

It is of interest to note that most of these grasses were irrigated only twice during the season.

The following notes were taken at the time of harvest.

Plat AII-1. Mixture A. Some bromus inermis and tall oat grass heading at one foot high. Other grasses six to eight inches high. Brome and rye grasses apparently prevailing. Thin scattering growth of volunteer alfalfa and clover. Considerable fox tail and other weeds.

29 November, 1913.

FIELD NOTES.

Huntley (Pasture Grasses — continued).

Plat AII-2. Mixture B. Some brome heading at 18 inches high. A little tall oat grass heading at two feet. Other grasses eight inches high. Scattering growth of volunteer alfalfa and red clover. Considerable fox tail and other weeds.

Plat AII-10. Mixture C. Much heavier growth of alfalfa than of grasses. Alfalfa twenty-four to thirty inches high, one-quarter in bloom. Small amount of tall oat grass heading thirty inches high. Some alsike blooming at one foot high. Good growth of other grasses six to twelve inches high.

Plat AII-12b. Orchard grass. Very few plants heading. Heavy bunched growth of medium coarse blades twelve to fifteen inches high. Excellent pasture.

Plat AII-13a. Bromus inermis. About 25% headed, twenty-four to thirty inches tall. Heavy growth of foliage. Very uniform growth. Excellent pasture.

Plat AII-13b. Meadow fescue. Very small amount headed. Slight mixture of brome and red clover. Very heavy growth ten to twelve inches high.

Plat AII-11c. Tall fescue. Small amount headed; thirty to thirty-eight inches tall. Stems very coarse with few blades on upper stem. Heavy matted, rather coarse blades eight to twelve inches high.

Plat AII-11d. Italian rye grass. Small amount headed; twenty to twenty-four inches tall. Heavy mat of fine blades six inches high.

Plat AII-13c. Tall oat grass. Rather light growth of foliage twenty and one-half inches high. Some plants headed at thirty-two and one-half inches high.

Plat AII-13d. Orchard grass. Very few plants headed. Some mixture of tall oat grass. Heavy bunched growth of medium coarse blades twelve to fifteen inches high. Excellent pasture.

Plat AII-12d. Perennial rye grass. None heading. Thick heavy mat of fine blades. Not harvested.

29 November, 1913.

FIELD NOTES.

Truckee-Carson.

During the week ending November 15, the maximum temperature was 73, minimum temperature 25, and precipitation .67 inch.

The dormitory for the employes was practically completed. The men moved in on Saturday. This will remove the unsatisfactory sleeping conditions that have heretofore existed, probably making it easier to secure and retain the employes.

The plowing of Field "Y" was completed and the plowing of Field "Z" begun. Field "Y" was surveyed into 23 double plats, each 86.5 feet x 150 feet.

All the pine boxes along the north side of Field "Y" were removed. These boxes were installed in 1906 and were found to be badly decayed while the redwood boxes, installed in 1909, showed no signs of decay.

The average depth to ground water in the 17 test wells was 4.53 feet on November 18, showing an average fall of 0.04 feet since October 27.

The Churchill Creamery, under the management of C. J. Heisey, made a second importation of milch cows, consisting of 60 head, mostly Jerseys.

Scottsbluff.

Hogging Alfalfa and Corn in 1913.

The final results of hogging alfalfa and corn in Rotation 65, Scottsbluff Experiment Farm, in 1913, have recently been reported by Mr. Holden. The work with alfalfa was done with two lots of hogs. The first lot was used from May 2 to July 2, a period of 60 days, corresponding to the growing period of the first crop. The hogs in this lot were born in November, 1912. The second lot of hogs were about three months old when they were placed on the alfalfa July 6.

29 November, 1913.

FIELD NOTES.

Scottsbluff (Hogging Alfalfa and Corn — 1913, continued).

Eight individuals were turned in on July 6, and four more were added on July 20. The second period, July 6 to September 10 -- 66 days — corresponded approximately to the growing periods of the second and third crops, the latter being harvested from the other plats in the field a few days after the hogs were taken off the pastured plat. The results obtained with hogging alfalfa were as follows:

	First Crop.	Second and Third Crops.	Total.
Beginning of pasture period	May 2	July 6	---
End of pasture period	July 2	Sept. 10	---
Length of pasture period, days	60	66	126
Number of hogs pastured	5	13	---
Age of hogs at beginning, months	5	3	---
Initial weight, lbs	544	412	---
Final weight, lbs	925	960	---
Gain, lbs.	381	548	929
Gain per hog per day, lbs.	1.27	0.70	---
Value of gain at 7½¢	$28.58	$41.10	$69.68
Value of corn fed @60¢ a bu.	$11.22	$11.34	$22.56
Net value of gain	$17.36	$29.76	$47.12
Net value of gain, per acre	$69.44	$119.04	$188.48
Estimated yield of hay per acre, tons	1.84	3.62	5.46
Price paid by hogs, per ton	$37.74	$32.90	$35.32
Pounds of alfalfa for each pound of gain	2.41	3.30	2.93

In the above table, the initial weight of the hogs pastured between July 6 and September 10 is the July 6 weight of 8 hogs (273 lbs.) plus the July 20 weight of the 4 hogs added (139 lbs.). It is shown that the hogs produced from the 1/4 acre of alfalfa and $22.56 worth of corn 929 lbs. of meat; this is equivalent to 3716 lbs. per acre. This meat-

29 November, 1913.

FIELD NOTES.

Scottsbluff (Hogging Alfalfa and Corn — 1913, continued).

after the cost of the corn fed was deducted, was worth $188.48, which is the amount paid by the hogs for the alfalfa consumed. The estimated yield of alfalfa is the average yield of 11 comparable 1/4 acre plats in the same field. It is shown that on this basis the hogs paid $35.32 a ton for the alfalfa consumed.

The results obtained from hogging 1/4 acre of corn in the same rotation are given below. The results obtained in 1912 on the corresponding plat are given for comparison.

	1912	1913	Average
Hogging period, days	13	28	20
Number of hogs	7	6	6
Initial weight, lbs	817	--	--
Final weight, lbs	974	--	--
Gain per plat, lbs	157	253	205
Gain per acre, lbs	628	1012	820
Gain per hog per day, lbs	1.72	1.50	---
Current market price, cts	8	7.5	---
Net value of gain, per plat	$12.56	$18.97	---
Net value of gain, per acre	$50.24	$75.88	$63.06
Estimated yield of corn, bus	56.1	66.3	61.2
Price paid by hogs, per bu	$0.90	$1.14	$1.02
Pounds of corn for each pound of gain	5.00	3.67	4.17

In 1912, one sow and 6 pigs were used, while in 1913, 6 pigs were used and left on the plat for about twice as long as in 1912. The meat gains were considerably higher in 1913 than in 1912. This was due probably to two causes: (1) the hogs used were all young and would therefore use the feed more economically, and (2) the yield of corn was about 10 bushels per acre more in 1913 than in 1912. The estimated yield is the average of 5 plats in the same field in each instance. Considering both years, it is seen that the meat produced per acre averaged 820 pounds,

29 November, 1913.

FIELD NOTES.

Scottsbluff (Hogging Alfalfa and Corn – 1913, continued).

and was worth $63.06, and that the hogs paid an average of $1.02 a bushel for the corn consumed.

The carrying capacities of the fields used during the periods named were:

	Days	Hogs per acre.
Alfalfa, first crop (5 fall hogs)	60	20
Alfalfa, second and third crops (12 spring hogs).	66	48
Corn, 1912 (1 sow and 6 spring hogs)	13	28
Corn, 1913 (6 spring hogs).	28	24

Scottsbluff.

The week ending November 22 was spent in cleaning up about the farm, and hauling and baling hay.

The pig feeding work is progressing very nicely. On account of the warm weather during this week the pigs have not made as good gains as during the previous week when the weather was cooler.

Pen No.	Original weight.	Weight - 15 days feeding	Lbs. gain	Gain per hog per day	Feed Consumed				
					Potatoes	Barley	Bald Barley	Syrup	Corn
1	802	902	100	1.4				35	559
2	825	1026	201	1.9		734		98	
3	894	1056	162	1.5	480	701			
4	747	918	171	1.6		726			
5	761	976	215	2.0			829		

Note. Pen No. 1 was on feed only 10 days while the other pens were on feed 15 days.

Considerable difficulty was encountered in securing the proper proportion of syrup and potatoes for the feed. In the beginning, the hogs were fed one pound of grain to two of potatoes, but this was changed to ½ pound of potatoes to one of grain. The syrup, which is the Sugar

29 November, 1913.

FIELD NOTES.

Scottsbluff (Hogging Alfalfa and Corn - 1913, continued).

Factory syrup, was fed at the rate of one pound to every 100 pounds of live weight; this was increased to 1½ pounds, and later reduced to 1¼ pounds. It may be necessary to decrease it to one pound.

The cost of the syrup to beet growers is $8.00 per ton; to others it sells for $10.00 per ton.

Barley costs $1.25 per cwt., and corn at $1.00 per cwt. on the cob. Cull potatoes sell at from 25 to 30 cents per cwt.

The following yields of sugar beets on Field K are reported:

Plat No.	Rot. No.	Tons per acre.
I-12	23	21.41
16	21	20.83
II- 4	31	23.80
7	61	23.39
12	40	21.15
16	20	19.55
18	2	16.03
III- 1	18	18.09
4	30	17.03
7	60	17.19
12	42	15.41
16	22	18.31
IV- 4	32	17.23
7	62	16.89
	Average.....	19.02

Belle Fourche.

During the week ending November 22, the maximum temperature was 62, and the minimum temperature 23.

The manuring, plowing, and discing of Plats 38 to 46 in Field AII was completed.

Alfalfa in time of irrigation experiment was irrigated (AIII-33, AII - 29, 31, 34).

29 November, 1913.

FIELD NOTES.

Belle Fourche (continued).

Field O was double disced, and the plowing in Fields I and K completed.

Series VIII in Field G was plowed.

The tile on the siphon was completed and works very satisfactorily.

The irrigated forestry was plowed and left in the rough to prevent blowing.

The balance of the time during the week was devoted to repairing irrigation ditches and hauling manure.

San Antonio.

During the week ending November 22, the maximum temperature was 83, minimum temperature 64, and greatest daily range 19. The total precipitation for the week was .46 inch.

Plowing of cotton plats in the rotation experiments was continued, and the following plats were plowed: A4-1, A6-3 and 10, A5-4, B5-4 and 17, B6-2, 6, 8, 12 and 18. Rye as a green manure crop was again sowed on B6-17, owing to the failure of the seed first sown to germinate.

Twenty-five rows were planted to oat selections of Appler Rustproof oats on B4, there being sufficient seed of each selection to plat a row 264 feet long. Ten single plant selections made this season were also planted.

The oats planted October 16 on C3 for the purpose of conducting an oat pasturing experiment have made excellent growth, and will be sufficiently large to begin pasturing by December 1.

The Canada field peas and oats on the rotation plats are making excellent growth, the stand being nearly perfect, with the exception of those planted on cotton land plowed just previous to planting, where germination of some seed was delayed until showers came.

29 November, 1913.

FIELD NOTES.

San Antonio (continued).

This year's experience indicates the undesirability of plowing cotton land for oats. C3 was in cotton the past season, and was prepared for oats by plowing out the cotton stalks and burning, and then giving the land a double discing and cross harrowing. The oats sown on this field October 16 made rapid and even germinations, and have continued to make excellent growth. It seems that this is the more desirable method of preparing cotton land for fall crops, as the expense is much less, the seed bed is firmer, and germination seems more certain and rapid.

6 December, 1913.

FIELD NOTES.

Truckee-Carson.

During the week ending November 22, the maximum temperature was 53, minimum temperature 17, and precipitation .18 inch.

The work of preparing Field "Y" for the drainage and reclamation experiments to be carried on in 1914 was continued. Hard night freezes towards the end of the week caused some delay with this work.

Manure was hauled from J. W. Ferguson's ranch and applied to Plat N-5.

A porch was built on the south side of the dining hall.

The Reclamation Service will construct a drain ditch starting from the center of the east line of the Experiment Farm and extending directly east. Several miles to the east the water collected by this drain will be raised to higher drains by means of an electric pump. Since this drainage system starts near the mouth of "C" drain it will be possible for us to deepen this drain two or three feet below its present level. It may also be possible to connect our "Y" drainage system with the deep drain of the Reclamation Service, making our present pumping plant unnecessary.

Potato Variety Test.

Twelve varieties of potatoes were planted May 7 in N-14 and 15. Each variety was planted in single rows, and where the quantity of seed permitted, the series was duplicated. At harvest time field was found to be so spotted that it was decided to measure off 50 feet of each row near the center of the field where the soil was apparently uniform. The results

6 December, 1913.

FIELD NOTES.

Truckee-Carson: (Potato Variety Test-continued).

of this test are shown in the table below:

No.	Name	Number of 50-ft. rows averaged.	Yield per 100-ft. rows, Lbs. Marketable.	Unmarketable.	Total.
2249	Burbank	2	29	36	65
1570	White Beauty	2	36	25	61
1571	Colorado Mammoth Pearl	2	45	32	77
1138	Rural New Yorker, Selected	2	21	25	46
1539	Red Ohio, Selected	2	23	20	43
569	Early Ohio, Selected	2	27	18	45
1538	Early Triumph	2	34	25	59
1893	Extra Early Triumph	1	26	36	62
----	White Ohio	1	24	14	38
1895	Early Rose, Selected	1	52	32	84
1894	Burbank, Selected	1	40	24	64
1892	Extra Early Ohio	1	22	12	32

Experiment to Determine Effect of Various Percentages of Sodium Carbonate in the Soil upon the Germination of Wheat Seeds and upon the Growth of Wheat Seedlings.

Three hundred grams of soil were weighed into each of 36 common drinking glasses. Solutions of sodium carbonate were made up and added to the glasses, as indicated in the table. Water was added to each glass to bring the moisture content of the soil to 15%. This percent of water was approximately maintained by bringing the glasses back to weight by the addition of

6 December, 1913.

FIELD NOTES.

Truckee-Carson :
(Sodium carbonate tests - continued).

distilled water each day. The experiment was conducted in triplicate, 5 wheat seeds being used in each glass.

An analysis of the salt content of the soil used in the experiment showed the presence of .095% sodium bicarbonate but there were no carbonates, chlorides, or sulfates present.

	Percent Na_2CO_3		Average of three series.	
No.	In soil	In solution	Per cent germination to Nov. 20.	Average height Nov. 20
1	0	0	100	18.2 c. m.
2	.05	.30	100	16.3 c. m.
3	.10	.60	100	15.5 c. m.
4	.15	.90	87	6.5 c. m.
5	.20	1.20	60	3.5 c. m.
6	.25	1.50	33	1.6 c. m.
7	.30	1.80	6.7	* 2.3 c. m.
8	.35	2.10	0	0 c. m.
9	.40	2.40	0	0 c. m.
10	.45	2.70	0	0 c. m.
11	.50	3.00	0	0 c. m.
12	.60	3.60	0	0 c. m.

* This result is based on the height of only one plant, and is practically meaningless.

It will be seen from the table that there is apparently a deterrent effect on the growth of the seedlings even with .05% of the carbonate in the soil, and that with .15% in the soil the growth is only one-third as great as normal growth.

6 December, 1913.

FIELD NOTES.

Truckee-Carson.

(Sodium carbonate tests - continued).

This experiment will be continued until about January 1, and the final determination of growth obtained by weighing the plants.

PERSONAL.

Mr. C. E. Brodie reported at the Washington office on November 28, having been detailed to this office for the purpose of assisting in the clerical work incidental to the visits of the various field men to Washington.

Messrs. Dan Hansen and J. A. Holden arrived in Washington December 4, and reported to the Washington office.

Huntley.

Time-of-Cutting Test with Alfalfa in 1913.

A time-of-cutting test was conducted on 16 1/4-acre plats of alfalfa in Field AI, at the Huntley Experiment Farm in 1913. The original plan provided that in each crop a cutting should be made at the first appearance of the basal shoots, and other cuttings at 5-day intervals thereafter. This plan was followed throughout, except in the second pair of plats in the second crop, when an interval of 10 days elapsed, so that the second and third pairs were cut on the same date. Each pair of plats was irrigated independently of the others according to its own apparent water requirements. The plats were irrigated but once for each of the first, second and

6 December, 1913.

Huntley.
(Time-of-Cutting Test -- continued).

fourth crops; for the third crop, plats 10, 15 and 16 were irrigated three times, while all the other plats received two irrigations.

The dates of harvest and the yields are given below:

FIELD AI

Alfalfa.

Plats	First Crop Date Cut	First Crop Yield	Second Crop Date Cut	Second Crop Yield	Third Crop Date Cut	Third Crop Yield	Fourth Crop Date Cut	Fourth Crop Yield	Total Crops	Total Yield
AI - 6	6/5	1.96	7/17	1.38	8/22	1.40	10/1	0.80	4	5.54
-11	6/5	1.77	7/17	1.35	8/22	1.48	10/1	0.82	4	5.42
Average ...		1.86	.....	1.36	.....	1.44	.....	0.81 ..	4...	5.47
AI - 7	6/10	2.54	7/27	1.70	8/27	1.83	10/1	0.35	4	6.42
-12	6/10	2.13	7/27	1.22	8/27	1.58	10/1	0.32	4	5.25
Average ...		2.33	.....	1.46	.....	1.70	.....	0.33 ..	4...	5.82
AI - 8	6/14	2.00	7/27	1.97	9/1	1.44	----	----	3	5.41
-13	6/14	1.84	7/27	1.45	9/1	1.35	----	----	3	4.64
Average ...		1.92	.....	1.71	.....	1.39		..	3...	5.02
AI - 9	6/20	1.43	8/2	1.52	9/6	1.34	----	----	3	4.29
-14	6/20	1.73	8/2	1.94	9/6	1.52	----	----	3	5.19
Average ...		1.58	.....	1.73	.....	1.43		..	3...	4.74
AI -10	6/25	2.59	8/7	1.90	9/12	1.66	----	----	3	6.15
-15	6/25	2.70	8/7	2.02	9/12	1.90	----	----	3	6.62
-16	6/25	2.25	8/7	2.16	9/12	1.75	----	----	3	6.16
Average ...		2.51	.....	2.03	.....	1.77			3	6.31

Huntley.
(Time-of-cutting test - continued).

In one respect these results agree with those obtained on the Truckee-Carson Farm, as reported in the Bulletin of November 22, that is, infrequent cutting with one less crop during the season was more profitable than frequent cutting and one more crop. The chief point of interest in this connection is the apparent effect of delayed cutting of the first crop on the growth of the second crop. It is widely believed that to delay cutting until the basal shoots are sufficiently long to be cut off by the mower depresses the yield of the succeeding crop, or, at least, retards its growth. This effect failed to appear in the Huntley experiment, as is shown in the table below. It is assumed that the alfalfa on all the plats began growth on April 1, and the growing periods of the first crop are figured on this assumption. The table shows these growing periods, the yields of the first crop, the length of the basal shoots at the time the first crop was cut, and the growing period and yields of the second crop.

	First Crop.			Second Crop.	
Plats	Growing period, days	Basal shoots, inches	Yield tons per acre	Growing period, days	Yield tons per acre
6&11	66	0.5	1.86	42	1.36
7&12	71	1.0	2.33	47	1.46
8&13	76	2.0	1.92	43	1.71
9&14	81	3.0	1.58	43	1.73
10,15&16	86	4.0	2.51	43	2.03

The striking thing shown in this table is that while the growing period of the first crop and the length of the basal shoots at the time of cutting increase progressively in the five series of plats, the yields of the second crop increase in the same direction. In other words,

Huntley.
Time (Time-of-cutting Test - continued).

the yields increased under conditions which are commonly expected to depress yields.

It is interesting in this connection to compare these results with those obtained at Truckee-Carson and mentioned above. The growing periods (assuming April 1 as the starting date) and yields at Truckee-Carson are summarized below, the yields being expressed as grams per plat:

	First Crop.		Second Crop		Third Crop		
Plats	Days	Yield	Days	Yield	Days	Yield	Total Yield.
1-A,B&C	63	1157	44	885	82	560	2602
2-A,B&C	70	1225	51	825	68	500	2550
3-A,B&C	79	1535	56	810	54	330	2675
4-A,B&C	85	1525	66	800	--	---	2325
5-A,B&C	96	1775	68	645	--	---	2420

No data are available in this case relative to the basal shoots, but the above table shows that the second crop yields varied inversely as the length of growing period of the first crop. This is exactly contrary to the results obtained at Huntley. The comparison is not strictly correct because at Truckee-Carson the growing period of the second crop, as well as that of the first crop, was varied considerably, while at Huntley, it was practically uniform. Nevertheless, it seems that the effect at Truckee-Carson was the opposite of that at Huntley, for the variations in the growing period of the second crop at Truckee-Carson were such that increased yields would be expected on the plats where decreased yields were actually obtained; that is, increased yields would naturally be expected from the longer growing periods.

The climatic conditions affecting the second crop are, of course, different from those affecting the first crop; but the fact that directly opposite results were obtained at the two farms suggests that some extensive uniform experiments should be inaugurated at several of our farms to determine what effect deferred cutting really has.

6 December, 1913.

Time-of-Cutting Alfalfa in Relation to Growth Efficiency.

During the past season experiments in time-of-cutting alfalfa have been conducted at Huntley and Truckee-Carson, and the results of these experiments have been reported elsewhere in this Bulletin. While these results are not as satisfactory or as consistent as might be desired, nevertheless, those at Huntley indicate that delay in harvesting the first crop of alfalfa results in greater growth efficiency for the season. This result in contrary to the generally accepted opinion among agronomists, and the subject is of sufficient importance to merit further and more careful investigation. If possible, the experiments should be continued at Huntley and Truckee-Carson, and it might well be inaugurated at Yuma, and possibly also at Belle Fourche and Scottsbluff.

If it is true that delaying the first cutting results in larger crops for the later cuttings, of which the growth period is the same length, it is important to establish that fact definitely, to measure the amount so obtained, and to ascertain the physiological reasons for this difference. It may be desirable to supplement the field experiments with critical studies on individual plants grown either in the open field or in large pots.

A working hypothesis, which may or may not be correct, is suggested by the experiments already made. This hypothesis is that as a result of the longer growing period of the first crop additional food material is stored in the alfalfa roots, and, consequently, the second and later crops have this reserve food material to draw upon in addition to the food material supplied by root absorption. Some collateral observations made by Kellerman and by Briggs and Shantz, as yet unpublished, tend to support this hypothesis. Kellerman has observed that when alfalfa tops are removed frequently the total root growth and the nodular development on the roots is much less than when the tops are allowed to grow for longer periods. Briggs and Shantz have found that when alfalfa tops are cut fre-

Time-of-Cutting Alfalfa Tests - continued.

quently, that is, at ten-day intervals, the total production of dry matter per plant is much below that obtained from cutting at the normal period for hay production. In other words, it appears probable that when the alfalfa top is left on the plant until the end of the flowering period there is a much larger root development, and probably a much greater storage of material in the roots than when the tops are removed at the beginning of the flowering period, or sooner.

This matter is of sufficient importance to merit careful investigation, and because of the long growing season, and consequent better opportunity for repeated observations at Yuma, it is to be hoped that Mr. Blair, particularly, may be able to plan and carry through a series of experiments which will throw further light on this question.

Concretely stated, there are two questions to determine: (1) whether a delay in cutting the first crop of alfalfa until the plants are in full bloom results in increased growth efficiency of the succeeding crop, and, (2) whether this delayed cutting of the first crop results in the storage of starch or other food material in the roots of the plant, which material is available for the later crops.

C. S. S.

Huntley.

Dairy Cow Importation.

Mr. E. M. Smith, until recently cashier of the State Bank of Huntley, Montana, called at the office on December 4, in company with Mr. Hansen, and made a statement of the relationship of the Huntley Bank to an importation of dairy cows made to the Huntley Project last August. These cows were imported in general accordance with a plan suggested in a circular letter sent out by this office a year ago and distributed among reclamation officials on the various projects.

Huntley : (Dairy Cow Importation — continued).

The importation was a small one, but two of its features are of special interest. The first is that the bank financed the enterprise, and the second is that a form of rural credit organization is being tried out on a small scale, in connection with the purchase of the stock.

Fifty-four grade females - yearlings, two-year-olds, three-year-olds, and mature cows — and three pure bred bulls were imported. The animals were all Holsteins. The prices paid ranged from $60 to about $95, the average being about $75.

In payment, the bank accepted individual notes payable in one year, with the stipulation that payment should be made in monthly installments, each installment being one-half the amount of the cream checks. In addition to the notes, the bank took chattel mortgages on the stock purchased by each farmer. There was no stipulation that the farmers should pay any installments before the cows were producing. This is more favorable to the farmer than the plan being used on the Truckee-Carson Project (as reported in the Weekly Bulletin for Nov. 22), where a minimum of $2.50 per month per cow is demanded, irrespective of the cows' production. The Huntley Bank, while requiring notes payable in one year, has an understanding with the farmers that the notes will be renewed in cases where the production of the cows is not sufficient to pay the notes according to the present plan. Interest at the rate of 8 percent is charged on deferred payments. This is 4 percent less than the bank regularly charges, the reduced rate being allowed as a special inducement to the farmers to engage in dairying.

The rural credit feature of the enterprise is this: Before financing the importation, the bank required the farmers to organize a dairy association, and this association, through its five directors, guarantees the payment of the individual notes. In this way, the entire organization is made to take an active interest in the welfare of each individual in the

Huntley : (Dairy Cow Importation — continued).

association.

Mr. Smith stated that the stock were sold within a few hours of their arrival at Huntley; that a much larger number could easily have been sold if they had been available; that the farmers whose cows are producing are making their payments promptly, and that the plan is working very satisfactorily in all respects.

FIELD NOTES.

Yuma.

During the week ending November 15 the maximum temperature was 78, minimum temperature 41, and greatest daily range 33.

The installation of the cement tile drain in the slough on the south section of "A" series was completed during the week. Sixteen different mixtures of concrete made into tile have been placed in such a manner that one portion of each may be removed and examined each year for ten successive years, so that the durability of each kind of conrete can be determined.

Winter garden plantings were made on A-12_2 as follows:

Beets - Early Blood Turnip : Detroit Dark Red.
Cabbage - All season, Early Winningstadt, Henderson Early.
Carrots - Ox Heart.
Celery - Dwarf Golden Self Blanching.
Kohl Rabi - White Vienna.
Lettuce - Brown Dutch, Prize Head, Wonderful.
Onions - Australian Brown, Crystal Wax, Prize Taker, White Australian.
Parsley - Moss Curled.
Peas - American Wonder, Yorkshire Hero.
Radish - Early Scarlet Turnip.
Turnips - Extra Early White Milan, Purple Strap leaf.

6 December, 1913.

FIELD NOTES.

Yuma (continued).

Stubble of milo on border E7&8 was plowed under. Dwarf Milo was seeded on this newly leveled land March 3 in rows three and one-half feet apart. Growth was very slow during the early spring, and stooling was very great, perhaps caused largely by the cold nights of this season. On May 2 this planting was thinned to the following stands which on September 11 gave the following yields of grain in heads:

	Lbs. per acre.	Tons per acre.
Unthinned	2918	1.49
6" thinning	3275	1.64
12" "	2531	1.27
18" "	2580	1.29
24" "	2828	1.41

Threshed grain yields will be ascertained later. On September 16 the fodder was cut from the total planting of one acre. It yielded 3.28 tons of cured stalks.

Leveling on B-13 to 17 land continues, also, cotton picking.

Various row plantings of Peruvian alfalfa were made on borders B-18 to 24, inclusive.

This station has recently purchased the following equipment:

16" two-way sulky "John Deere" plow.
Baby Vibrator Separator.
One set of double work harness.
One set of double driving harness.

Scottsbluff.

The entire week ending November 29 was devoted to hauling hay and loading the same. Two cars were shipped to Ardmore, South Dakota, and three cars were

6 December, 1913.

FIELD NOTES.

Scottsbluff (continued).

shipped to the Experiment Station at Lincoln.

A trip by automobile was made through the Valley for the purpose of visiting a number of the sheep and cattle feeders.

Truckee-Carson.

During the week ending November 29 the maximum temperature was 57, minimum temperature 15, and precipitation .16 inch.

Mr. D. W. Cole, Project Engineer and Mr. Murphy, Drainage Engineer of the U. S. Reclamation Service, visited the Experiment Farm on the 24th, and examined carefully the the proposed drainage plan of the "Y" series. They recommend that in those plats where 4-inch tile are to be used that the tile be placed at a depth of not less than 4 feet, and that two rows of tile extend the length of each of those plats. They also thought it advisable to put ten inch tile in the bottom of the "Y" drain, placed two feet deeper than the present bottom, and that the grade be one foot per thousand. In accordance with these suggestions, twenty-five hundred feet of ten inch drain was purchased from the Reclamation Service. The hauling of this tile to the Experiment Farm was not quite completed.

On account of the freezing weather, little was done toward leveling the "Y" series. One man was kept busy repairing buildings and cleaning the grounds.

13 December, 1913.

Demonstration on Reclamation Projects.

Under this heading there is included in the estimates of appropriation for the Department of Agriculture for 1915 the following proposed legislation and explanatory note:

"To enable the Secretary of Agriculture to encourage and aid in the agricultural development of the Government reclamation projects; to assist, through demonstrations, advice, and in other ways, settlers on the Projects; and for the employment of persons and means necessary, in the city of Washington and elsewhere, $50,000, of which sum $10,000 shall be immediately available..... $50,000.

Note. This is a new item, for which an increase of $50,000 is requested. The object of this work is to aid the agricultural development of the reclamation projects; to assist, through advice and in other ways, settlers on the projects in the matter of developing their farms. It is planned that the work shall include all the different phases of farming and farm operations, such as the growing of staple crops, fruit growing, questions relating to animal husbandry, methods of marketing farm products, general subjects relating to rural organizations, etc. The demonstration work on the reclamation projects should include not only demonstration work in connection with plants, but also in connection with animal husbandry, dairying, etc.; therefore it has appeared inadvisable to include the work under any one bureau.

13 December, 1913.

Trial of Machinery.

Under date of December 1, Mr. Blair writes as follows:

"I desire to inquire of the general attitude held by the Bureau of Plant Industry or Department of Agriculture toward the cooperative demonstration of certain tools or machinery with firms or companies handling same."

This inquiry may be answered for this office without announcing a policy for the Bureau. I should advise the greatest caution in making cooperative trials or tests of tools or machinery. We must so conduct our operations as to be entirely free from any obligations or embarrassments. Since it is not always possible to anticipate the developments of any testing enterprise, it seems better to confine our tests to material which we own and control absolutely. We have made it a practice not to accept free any tools or machinery. Generally, we should do our investigating in advance of purchase.

Truckee-Carson.

In its issue of Nov. 26, a local newspaper publishes a summary of a paper on irrigation methods by Mr. Knorr. The summary gives Mr. Knorr's conclusions as to the proper methods of irrigating small grains, corn, potatoes, sugar beets, and alfalfa. It is not stated where Mr. Knorr's paper was published or read.

The same newspaper states that the local factory of the Nevada Sugar Company had, up to Nov. 26, manufactured about 14,000 bags of sugar in this year's campaign. The total beet crop of the territory contributory to the factory is estimated at somewhat less than 12,000 tons, of which about 8,000 tons have been harvested.

13 December, 1913.

FIELD NOTES.

Scottsbluff.

During the week ending December 6, the total precipitation was .82 inch.

On account of the snow storm and the rain which fell during almost the entire week, no outside work was done. Time was devoted to cleaning up the machine shed, culling over some potatoes, and similar work.

Proposed Dairy Work on the Truckee-Carson Project.

In connection with the need of animal industry work at western field stations, as discussed in the Weekly Bulletin of October 4, the following correspondence will be of interest:

Copy from Copy.

CHURCHILL CREAMERY,
INCORPORATED.

Fallon, Nev., Nov. 25, 1913.

Mr. F. B. Headley,
Fallon, Nevada.
Dear Mr. Headley:

We are writing you regarding a plan that we believe will do much to develop the dairy industry in this valley.

As you no doubt realize, the mere fact that we are bringing cows into the valley does not in itself spell success to the industry.

Our idea is to cooperate with the Agricultural Department or the Reclamation Service in educating the farmers.

13 December, 1913.

Proposed Dairy Work on the Truckee-Carson (continued).

With this end in view the Creamery recently purchased eighty acres of the Ferguson ranch, to be used as a demonstration dairy farm.

The farm will be equipped with all necessary machinery and buildings, but the equipment will be of the kind that will be practical for the farmer of limited means; that is, it will be efficient, yet economical.

We will also stock the ranch with high grade dairy cows which can be used in conducting feeding tests with the various crops that can be raised on the farm.

Your Department can help us materially in this work if they will furnish the valley with a competent expert dairy man. A man capable of conducting and recording the work, and of getting it out in pamphlet or bulletin form for distribution among the farmers. He could spend a large portion of his time among the farmers. Of course, we will furnish all rough labor.

The Creamery will give the Experiment Farm the use of portions of the ranch, for the growing of forage and other crops suitable for cows, with the understanding that such crops are fed to the cows on the ranch.

If your Department will take this matter up with Director Newell, of the Reclamation Service, I am sure that they will find him willing to give them every assistance possible, since he is very anxious to see the dairy industry develop.

We hope that you will give this plan your immediate attention.

Yours truly,

CHURCHILL CREAMERY, INC.

(Signed) per C. J. Heisey
Gen. Manager.

13 December, 1913.

Proposed Dairy Work on the Truckee-Carson (continued).

Copy from Original.

Fallon, Nev., Nov. 29, 1913.

Mr. C. S. Scofield,
Washington, D. C.
Dear Mr. Scofield:

I am inclosing herewith copy of a letter from Mr. C. J. Heisey, Manager of the Churchill Creamery, in which he asks that we use our services in securing a specialist from the Dairy branch of the Bureau of Animal Industry, to be located here and do what he can to educate the farmers in dairying and to promote the dairy industry.

I would like to have such a man sent here if it can be arranged as I believe dairying is going to be essential to the prosperity of the farmers of this project.

Very truly yours,
(Signed) F. B. Headley,
Superintendent.

Enclosure.

Copy from Carbon.

Dec. 6, 1913.

Mr. F. B. Headley,
U. S. Experiment Farm,
Fallon, Nevada.
Dear Mr. Headley:

I have your letter of November 29, which I am presenting to the Committee on Cooperation between the Bureaus of Plant and Animal Industries, as per letter to Mr. Chilcott, copy of which is enclosed. I shall push this matter as rapidly as possible, and hope something may develop from it.

Very truly yours,
(Signed) C. S. Scofield.

Enclosure.

13 December, 1913.

Proposed Dairy Work on the Truckee-Carson (continued).

Copy from Carbon.

Dec. 6, 1913.

Mr. E. C. Chilcott,
Chairman, Committee on Cooperation between
Bureaus of Plant and Animal Industry.
Dear Mr. Chilcott:

I hand you herewith a copy of a letter from Mr. F. B. Headley, our Farm Superintendent on the Truckee-Carson Project, enclosing a copy of a letter from Mr. C. J. Heisey, in reference to securing for the Truckee-Carson Project the services of an adviser in dairy matters.

As you know, I am much interested in the development of dairying and meat production on our Reclamation Projects, and it seems to me that the present situation on the Truckee-Carson offers a good opportunity for effective work along this line at small cost. In case you think the matter merits further consideration, I shall be glad to give you or your Committee further information, and I hope means may be found to take some action in the matter at an early date.

Very truly yours,
(Signed) C. S. Scofield.

Enclosures (2)

FIELD NOTES.

Yuma.

During the week ending November 22, two small rains occurred, on Sunday and Wednesday, the total precipitation being .0375 inch. The total precipitation as recorded at this station since January 1, 1913, is 2.09 inches. The maximum temperature for the week was 78, minimum temperature 41, and greatest daily range 33.

FIELD NOTES.

Yuma (continued).

The following grain and alfalfa plantings were made during the week:

D-43	Peruvian Alfalfa and Sonora Wheat.
$A-13_5$	Chilian Alfalfa and Abruzzes Rye.
$A-13_6$	Chilian Alfalfa, Sonora Wheat and Barley.
$A-13_7$	Chilian Alfalfa and Applers Rustproof Oats.
$A-14_8$	Applers Rustproof Oats.
$A-15_2$	Abruzzes Rye.

Alfalfa borders A-6 to 9, B-9 to 12, and C-6 and 7 were plowed under with a good growth of green manure. Borders A-6 to 9 grew alfalfa during 1912 which was turned under in September, and again they were resecded to Chilian Alfalfa in April, 1913. B-9 to 12 were seeded to Chilian Alfalfa in March, 1912, having been cleared and leveled the previous winter. The yields were not recorded from this plat during 1912. Hay yields of 1913 have no comparable value as these borders were pastured during a portion of the season. Borders C-6 and 7 were seeded to Chilian Alfalfa in February, 1912, but no yields for that season were recorded.

The following table gives the hay yields secured from these plats in 1913. On Plats A6, 7, 8 and 9 the first crop was harvested June 27, the second crop was harvested August 2, and the third crop was harvested September 8. On Plats B9, 10, 11 and 12 the first crop was harvested April 23, the second, June 2, the third, July 10, and the fourth,

13 December, 1913.

FIELD NOTES.

Yuma (continued).

August 30. On Plats C6 and 7 the first crop was harvested April 23, the second, June 2, the third, July 10, the fourth, August 19, and the fifth, October 15.

Plat No.	Area, acres	1st Crop, lbs.	2nd Crop, lbs.	3rd Crop, lbs.	4th Crop, lbs.	5th Crop, lbs.	Total tons per acre	Calculated tons per acre green manure	Equivalent air-dried hay, tons per acre
A-6	0.5	960	1050	610			2.62	1.2	0.68
A-7	0.5	770	670	390			1.86	1.2	0.68
A-8	0.5	420	750	580			1.76	1.2	0.68
A-9	.446	440	400	300			1.28	1.2	0.68
B-9 & 10	1.13	1000	1330	2230	1380		2.64	1.4	0.76
B-11 & 12	1.13	940	1180	2135	1540		2.57	1.4	0.76
C-6	0.52	300	350	630	480	470	2.17	1.4	0.76
C-7	0.52	470	490	605	650	396	2.54	1.4	0.76
Average		662	777	940	1012	433	2.18	1.3	0.72

Green manure weights were calculated from 1/40 acre average areas that were mowed, weighed, cured for seven days, and reweighed for dry hay equivalent calculations.

Five tons of stable manure was also added to each border B-9 & 10 and B-11 & 12. This was spread over the most sandy portions before alfalfa was plowed under.

13 December, 1913.

FIELD NOTES.

Yuma (continued).

It was necessary to repair the Malthoid roof of the farm house. The intense heat of summer decays and cracks this material badly.

Cotton ginning has been discontinued for several weeks until the late pickings are all made. All cotton in the valley picked to date has been ginned.

During the week ending November 29, the maximum temperature was 78, minimum temperature 37, and greatest daily range 39.

Alfalfa of a good growth on borders D-6 to 16, inclusive, was plowed under. This represents the first crops grown on these borders with the exception of D-16 which produced cotton the season of 1911. Plats D-6 to 9, and 13 to 16, were seeded to alfalfa in March, 1912, while D-10 to 12 were seeded during April, 1911. No yields were recorded from these plats prior to 1913.

The following table states 1913 yields and green manure calculated yields at date of plowing.

On Plats D6&7 and D8&9 the first crop was harvested April 28; second crop, June 10; third crop, July 11; fourth crop, August 18; fifth crop, October 4.

On Plats D-10 to D-12, inclusive, the first crop was harvested April 28; second crop, June 9; third crop, July 11; fourth crop, August 18; fifth crop, October 3.

On Plat D-13, the first crop was harvested April 28; second crop, June 9; third crop, July 11; fourth crop, August 16; fifth crop, October 3.

On Plats D-14 to D-16, inclusive, the first crop was harvested April 24; second crop, June 7; third crop, July 12; fourth crop, August 16; fifth crop, October 3.

13 December, 1913.

FIELD NOTES.

Yuma (continued).

Plat No.	Area, acres	1st Crop, lbs.	2nd Crop, lbs.	3rd Crop, lbs.	4th Crop, lbs.	5th Crop, lbs.	Total tons per acre	Calculated tons per acre green manure	Equivalent air-dried hay, tons per acre
D-6&7	1.1	945	1715	1280	1560	761	2.85	0.8	0.38
D-8&9	1.09	1610	2090	1685	1940	1346	3.95	0.8	0.38
D-10	0.52	810	965	810	930	391	3.72	0.8	0.38
D-11	0.515	355	605	530	810	611	2.82	0.2	0.10
D-12	0.537	290	605	470	890	541	2.61	0.2	0.10
D-13	0.531	892	1175	740	1140	521	4.31	1.16	0.56
D-14	0.527	925	1330	1150	990	583	4.72	1.16	0.56
D-15	0.538	785	1085	980	1050	610	4.19	1.16	0.56
D-16	0.542	675	1020	1070	1000	556	3.98	1.16	0.56
Average...	.....	810	1177	968	1146	658	3.68	.83	0.40

The farmhouse floors and porch floors were repainted.

Messrs. F. H. Newell and F. L. Sellew, of the Reclamation Service, and Mr. R. H. Forbes, of the Arizona State Experiment Station, visited the farm Tuesday, November 25.

Mr. Blair spent several days during the week in the Imperial Valley.

13 December, 1913.

FIELD NOTES.

San Antonio.

During the week ending November 29, the maximum temperature was 79, minimum temperature 55, and greatest daily range 21. The total precipitation was 3.07 inches.

Rain fell on four of the six working days. No field work was possible during the week. Sufficient time was found between showers to construct a fence around the oats on C3, which are to be used in carrying on the oat-pasturing experiment.

20 December, 1913.

ALFALFA-SHRINKAGE DETERMINATIONS IN 1913.

A. Huntley.

In connection with a test to determine the best time to cut alfalfa at the Huntley Experiment Farm, as reported in the Weekly Bulletin of December 6, Mr. Hansen made some determinations of the loss in weight of alfalfa cut at different times. Beginning June 14, a 10-pound sample of green alfalfa was taken at each cutting. These samples were placed in burlap bags and hung up in a well ventilated, dry place, and weighed periodically until they ceased to lose weight. It required from two to four weeks for the samples to become air dry. At the time of each sampling, the length of the basal shoots and the stage of flowering were estimated. In the following table, the losses in weight, expressed as percentages of the green weights, are given in detail:

Plat Nos.	Date Cut	Basal Shoots	Bloom	Loss in weight, percent of green weight. Single sample	Average	No. of samples.
				(First Crop)		
A-I- 8	6/14	2"	1/10	80.6		
-13	6/14	2"	1/10	77.5	79.0	2
- 9	6/20	3"	1/2	76.0		
-14	6/20	3"	1/2	76.0	76.0	2
-10	6/25	4"	Full	76.0		
-15	6/25	4"	Full	74.8	75.4	2
					76.8	6

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Alfalfa-Shrinkage Determinations (continued).

Plat Nos.	Date Cut	Basal Shoots	Bloom	Loss in weight, percent of green weight. Single sample	Average	No. of samples
				(Second Crop)		
A-I- 6	7/17	0.5"	Trace	74.2		
-11	7/17	0.5"	Trace	73.6	73.9	2
- 7	7/27	4"	1/5	77.2		
- 8	7/27	3"	1/10	77.8		
-12	7/27	4"	1/3	70.6		
-13	7/27	3"	1/4	73.6	74.8	4
- 9	8/2	2"	1/10	76.6		
-14	8/2	2"	1/10	80.0	78.3	2
-10	8/7	2"	1/5	77.2		
-15	8/7	3"	1/5	77.8		
-16	8/7	3"	1/5	78.4	77.8	3
					76.2	11
				(Third Crop)		
- 6	8/22	0.5"	Trace	80.0		
-11	8/22	1.0"	1/20	78.4	79.2	2
- 7	8/27	2"	1/20	80.0		
-12	8/27	2"	1/10	79.0	79.5	2
- 8	9/1	1"	1/20	76.0		
-13	9/1	2"	1/10	70.0	73.0	2
- 9	9/6	1"	1/20	75.4		
-14	9/6	2"	1/20	72.4	73.9	2
-10	9/12	1"	1/20	77.8		
-15	9/12	1"	1/20	78.4		
-16	9/12	1"	1/20	74.8	77.0	3
					76.5	11

Alfalfa-Shrinkage Determinations (continued).

It is seen that the first crop lost an average of 76.8 percent of its green weight; the second crop, 76.2 percent; and the third crop, 76.5 percent. In the first crop, the losses diminished with the increase in the age of the alfalfa at cutting time, and they appear to be closely associated with the estimated length of the basal shoots and the estimated stage of flowering. This association was not apparent in the second and third crops.

In the second table the results obtained from the 28 samples are classified first, on the basis of crop; second, on the basis of length of basal shoots; and third, on the basis of flowering stage.

Classification	No. of samples	Loss in weight, percent.			
		Highest	Lowest	Range	Average
First Crop	6	80.6	74.8	5.8	76.8
Second Crop	11	80.0	70.6	9.4	76.2
Third Crop	11	80.0	70.0	10.0	76.5
Three crops.....	28	80.6	70.0	10.6	76.5
Length of basal shoots					
½ inch	3	80.0	73.6	6.4	75.9
1 inch	6	78.4	75.4	3.0	76.8
2 inches	9	80.6	70.0	10.6	77.0
3 inches	6	78.4	73.6	4.8	76.6
4 inches	4	77.2	70.6	6.6	74.6
All samples.....	28	80.6	70.0	10.6	76.5
Flowering stage:					
Trace of bloom	3	80.0	73.6	6.4	75.9
1/20 bloom	8	80.0	72.4	7.6	76.6
1/10 bloom	7	80.6	70.0	10.6	77.3
1/5 bloom	4	78.4	77.2	1.2	77.6
1/4 bloom	1	73.6	73.6	---	73.6
1/3 bloom	1	70.6	70.6	---	70.6
1/2 bloom	2	76.0	76.0	---	76.0
Full bloom	2	76.0	74.8	1.2	75.4
All samples.....	28	80.6	70.0	10.6	76.5

Alfalfa Shrinkage Determinations (continued).

The third column under the heading "Loss in Weight" is given to show the range of variation in the weights of samples of the same class. When this range is considered it is evident that there were few, if any, significant differences among the different classes. The figures given have at least two values: First, the average loss in weight of the 28 samples (76.5 per cent) should fairly represent the average shrinkage to be expected at Huntley, since it was obtained from samples cut on 12 different dates from June 14 to September 12. Second, the data showing a very close agreement in the losses with the first, second, and third crops are probably sufficient to indicate that wide differences in the average shrinkage of first, second, and third crop alfalfa are not likely to occur.

B. Truckee-Carson.

Shrinkage determinations were also made at the Truckee-Carson Experiment Farm in connection with the time-of-cutting test reported in the Weekly Bulletin of November 22.

The freshly cut alfalfa was placed in light cloth sacks and weighed immediately. The sacks were then hung in the sun and wind until the alfalfa ceased to lose weight, but would fluctuate in weight according to the humidity of the atmosphere. The lowest weights were then recorded and the results calculated. The process of drying in this manner required from two to four weeks.

In the first crop the first series was cut June 2, at the appearance of the first bloom, and the remaining series at approximately 1, 2, 3, and 4 weeks thereafter.

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Alfalfa-Shrinkage Determinations (continued).

The first series of the second crop was cut July 16, when the first blossoms had appeared, and the remaining series at approximately 2, 4, 6 and 8 weeks thereafter. Although these cuttings were 2 weeks apart, each succeeding cutting is only one week further towards maturity than the preceding one, as they were cut at intervals of one week for the first crop.

The results in detail as reported by Mr. Headley are given below:

Date Cut.	Loss in weight, percent of green weight. A.	B.	C.	Average
	(First Crop)			
June 2	81.0	81.6	77.3	80.0
9	79.0	80.5	79.6	79.7
18	75.0	74.7	76.2	75.3
24	75.0	77.0	77.3	76.4
July 5	74.0	75.3	73.7	74.3
Average of first crop, 15 samples.....				77.1
	(Second Crop)			
July 16	78.8	79.2	78.2	78.7
30	77.5	77.7	76.3	77.2
Aug. 13	75.6	73.4	71.7	73.6
29	75.8	77.7	73.6	75.7
Sept.11	75.0	75.5	74.0	74.8
Average of second crop, 15 samples...				76.0

The above table shows that there was a tendency in both the first and the second crop for the shrinkage to decrease as the age of the plants increased; but the differences were neither large nor entirely consistent.

Alfalfa Shrinkage Determinations (continued).

In the second table the results are classified, first, on the basis of crop, and, second, on the basis of time of cutting in each crop.

Classification.	Number of Samples	Loss in Weight, per cent of green weight.			
		Highest.	Lowest.	Range.	Average.
First Crop.....	15	81.6	73.7	7.9	77.1
Second Crop.....	15	79.2	71.7	7.5	76.0
1st and 2nd crops.	30	81.6	71.7	10.9	76.5
First Crop:					
Cut June 2	3	81.6	77.3	4.3	80.0
" 9	3	80.5	79.0	1.5	79.7
" 18	3	76.2	74.7	1.5	75.3
" 24	3	77.3	75.0	2.3	76.4
July 5	3	75.3	73.7	1.6	74.3
All Samples	15	81.6	73.7	7.9	77.1
Second Crop:					
Cut July 16	3	79.2	78.2	1.0	78.7
30	3	77.7	76.3	1.4	77.2
Aug. 13	3	75.6	71.7	3.9	73.6
29	3	77.7	73.6	4.1	75.7
Sep. 11	3	75.5	74.0	1.5	74.8
All Samples	15	79.2	71.7	7.5	76.0

The results at Truckee-Carson agree, in general, with those at Huntley. The average shrinkage of the 30 samples cut on ten different dates between June 2 and September 11 was 76.5 per cent, which is exactly the average obtained from the 28 samples taken at Huntley. There was at Truckee-Carson more of a tendency for the older plants to lose less weight than

Alfalfa Shrinkage Determinations (continued).

there was at Huntley, but when the range in variation of samples of the same class is considered it is evident that these differences are insignificant.

C.— Summary.

1. At Huntley 28 samples were taken on 12 different dates, from June 14 to September 12; at Truckee-Carson, 30 samples were taken on ten different dates, from June 2 to September 11.

2. The average shrinkage of all samples at each place was 76.5 per cent of the green weight.

3. The highest shrinkage at Huntley was 80.6 per cent and at Truckee-Carson 81.6 per cent; the lowest was 70 per cent at Huntley and 71.7 per cent at Truckee-Carson; the extreme range was 10.6 per cent at Huntley and 10.9 per cent at Truckee-Carson.

4. The results at both places fail to show any consistent significant differences in the shrinkage of samples cut on the various dates.

5. The determinations indicate that the shrinkage of alfalfa on the two projects can be expected to average about 75 per cent and to fluctuate between 70 and 80 per cent.

The fact that the shrinkage is so nearly constant suggests the advisability of using the green weight instead of the "weight of cured hay" in reporting experiments with alfalfa in cases where the plats are sufficiently small to make gree weight determinations practicable. It seems that to determine green weight and then assume 25 per cent of this weight as the "wesight of cured hay" might be more nearly accurate than direct weighing of "cured hay". The weight of the latter must vary widely, because of the varying moisture contents of different samples at the time they are considered as "cured hay". Another possible advantage in determining green weights on small plats is that such a method would decrease the danger of losing the results or having

Alfalfa Shrinkage Determinations (continued).

their value impaired through the action of wind, rain, stray live stock, etc. Where the green weight was to be determined, special weighing apparatus would be necessary in order to facilitate quick, convenient, and accurate determination.

F.D.F.

FIELD NOTES.

Huntley.

Variety Test of Corn.

A variety test of corn to determine varieties earliest maturing and best suited to this region was carried on in Field C-V in 1913. Seven varieties recommended by Mr. Zook, of the Office of Corn Investigations, were used, as follows: Minnesota No. 13, Northwestern Dent, Minnesota No. 23, U. S. Selection No. 133, Brown County Yellow, Ardmore Dent, and Disco Flint.

The ground on which this experiment was conducted was planted to oats in 1912 and was broken up from alfalfa in 1911. The ground was prepared by plowing 8 inches deep in the fall of 1912, left rough during the winter, and double disked, harrowed, and leveled before planting.

Each plat contained two rows with rows 42 in. apart and 132 ft. long. Every other plat was a check planted to Minnesota No. 13. All varieties were run in triplicate. Seeding was done May 24, with a disk two-row planter. Seed was furnished by the Office of Corn Investigations. Seed was drilled thickly in the row and later thinned to about 18 inches. Actual stand counts were made

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FIELD NOTES.

Huntley (continued).

before harvest. Cultural operations were uniform on all plats as follows: Thinned July 8; cultivated June 10, July 7, and July 24; irrigated June 17 and July 21. The season was unusually favorable for corn and all varieties were fully matured before the first frost, on September 19. The results are given in the following table:

Number of plats Averaged	Variety.	Date of Maturity			Bushels per Acre.			
		Earliest	Latest	Average	Highest.	Lowest.	Average.	Aver. Stand
19	Minnesota 13	9/12	9/15	9/14	53.0	9.2	27.42	15982
3	Selection 133	9/12	9/15	9/14	32.1	18.3	26.16	17103
3	Ardmore Dent			9/15	43.9	14.8	25.63	13960
3	N.W. Dent			9/5	30.9	17.4	25.13	15062
3	Brown Co.Yel.			9/15	38.4	14.4	24.43	17043
3	Minnesota 23	9/12	9/15	9/14	28.7	18.42	23.66	16697
3	Disco Flint	9/5	9/10	9/7	32.0	6.4	18.1	12043

Truckee-Carson.

During the week ending December 6 the maximum temperature was 46, minimum 13.

The work of digging and tiling "Y" drain was continued throughout the week. Three laborers are occupied with this work. On account of the cold nights the bottom of the ditch is frozen to a depth of several inches, so it is necessary to break it up with picks, making the work slow.

The Potato Industry in Aroostook County, Maine.

Mr. Scofield recently made an unofficial visit to Maine for the purpose of looking into the poultry and potato industries of that State. The following notes, relating to the potato industry in the famous Aroostook County district, may be of interest.

The potato industry of Maine is chiefly developed in Aroostook County. According to the Census of 1910 there was about 443,000 acres of improved farm land in that County, of which about 75,000, or one-sixth, was devoted to the production of potatoes. The total yield of potatoes for the County, 17 million bushels, indicates an average yield per acre of about 250 bushels as compared to the average yield for the United States of less than 100 bushels per acre.

The three most important reasons for the high yields obtained in Maine appear to be:- (1) the methods of farming.-(2) the low temperatures of the growing season. (3) the favorable character of the soil.

There is every indication of general prosperity in that portion of Aroostook County devoted to the potato industry. A very large proportion of the population is of native American stock, substantial and conservative, yet wide awake and ready to make progress by the use of new methods, and used to living well. Director Woods, of the Maine Agricultural Experiment Station, remarked that few of the young men from the potato district came to the Agricultural College, for the reason that the opportunities for earning a good living were abundant, and they felt less the need for advanced education or a way to enter other professions than was the case in the less prosperous sections. The farms are well equipped with buildings. There is no marked tendency to live in the small towns instead of on the land, the roads are good, a majority of the farmers have telephones, and own automobiles.

The topography of the country is gently rolling. There are many small streams and the fields are irregular in shape because of wooded swamps and stream bottoms.

Potato Industry in Maine (continued).

The soil is derived from the local glaciation and weathering of a gray slate rock, which in many places lies close to the surface or protrudes. There is very little surface or floating rock, and the fields, once they are cleared, are easily tilled. The soil is very porous, more so than its rather fine texture would indicate. It absorbs water rapidly, and may be cultivated very soon after a rain.

The ordinary farm practice in Aroostook County is to follow potatoes with oats, in which clover and timothy are seeded. The land produces hay one or two years, and then goes into potatoes again. The Census figures for the crop of 1909 show for the County 75,000 acres of potatoes, 69,000 acres of oats, and 138,000 acres in clover and timothy, making a total of 282,000 acres out of a total of 443,000 acres of improved farm land in the county, or a balance of only 161,000 acres for all other crops and purposes. These areas would indicate in general a four-year rotation with very few cases of potatoes following potatoes. Cleared land is worth about $125 per acre.

The land is nearly always plowed in the fall, and it appears to be a general practice to plow after potatoes, although a Hoover digger is used. The land is free from weeds and oats is the following crop. Possibly this plowing may be necessary to get the potato tops into the ground and out of the way.

The potato seed is cut by hand, one eye to the piece, sprinkled with sulphur at the rate of 1 pound to the barrel of seed, and planted with a two-horse planter. Both the Iron Age and Aspinwall planters are used, the better farmers favoring the former type because of the rather better stand that results where it is properly operated. The rows are made 30 to 34 inches apart, and the plants from 10 to 12 inches apart in the row. It requires a reliable man to watch and feed the Iron Age planter, and four acres a day is considered good work for a team and two men. It requires 5 to 6 barrels of seed to plant an acre.

Potato Industry in Maine (continued).

As soon as the planting is finished the cultivators are started, even before the potatoes are up, and the cultivators are kept going continuously until the vines cover the ground in July. The Planet Jr. double row cultivator is used extensively but with the outer shovels removed and only one row is cultivated at a time. At this rate of working, the crop is cultivated about once a week from planting time until the middle of July. There are some horse weeders used when the plants are small but this implement is not popular because it is a very general practice to keep the rows ridged up from the first. Apparently, no hand hoeing is required, and the fields are said to be free from weeds.

The use of heavy applications of commercial fertilizers is one of the striking features of this industry. It is said that the average rate of application is about 1500 pounds per acre with a common range of from 1200 to 2400 pounds. The Census of 1909 reports the use of $1,844,568 worth of fertilizer in Aroostook County, which, if all applied to the potato acreage of that year, as was probably the case, makes an average cost of nearly $26 per acre. The great importance of fertilizers is indicated by the fact that, in 1909, the expenditure for farm labor in the County was but $1,100,000, or only about 61 percent of the amount expended for fertilizers. Most of the fertilizer used in high grade, containing about 4% nitrogen, 8% phosphoric acid, and 7% potash. It is said to cost about $30 per ton, f. o. b. local points. The general practice is to make two applications of fertilizer. The first is made at the time of planting, with the fertilizer attachment of the planter, and the second shortly afterward, either with the same machine, with the planting plow removed, or with a grain drill.

Potato Industry in Maine (continued).

During the growing period the potatoes are sprayed frequently, usually 5 or 6 times. An ordinary geared power sprayer is used. One rig is sufficient for 100 acres. The spray used is Bordeaux mixture to prevent blight. In case the potato beetle appears Paris green is added.

The potatoes are dug with a Hoover digger drawn by two horses. Probably the fact that the potatoes are grown in high ridges makes it possible to use two horses instead of four, as are ordinarily required elsewhere. One man and a team can dig about 2½ acres a day. The potatoes are picked into barrels without field sorting. The extra labor required for this work is paid $2.50 per day and board, or 6¢ per barrel and board.

As soon as picked, the potatoes are put into bins in buildings, mostly above ground rather than in cellars. They are sorted before shipment. The hauling is done on law wagons which are built locally. These wagons are made with a drop axle and flat bottoms, which are carried well forward and back between the wheels and extend on each side to the outside width of the wheels The bottoms clear the ground by 10 to 12 inches.

It is estimated by well informed growers that it costs about $85 per acre to produce a crop of potatoes. This cost includes an average application of fertilizer and rent of the land. This last item is generally $15 per acre. Of course, this high rent is paid only for the use of land that has been in clover, and only for the one crop of potatoes. Another way of stating the case is that to make anything like a fair living the grower must get the equivalent of $1.25 per barrel for potatoes in the bin, estimating an average yield of 100 barrels per acre. The apparent difference in these two estimates is probably due to the fact that little, if any, profit is to be expected from the oats and hay which occupy the land 3 years out of 4.

Potato Industry in Maine (continued).

In conclusion it may be said that the potato industry of Aroostook County appears to be well developed and highly prosperous. It has been slow in growth, and has been important for at least 40 years. Aside from potatoes, hay is almost the only other cash crop of the region. There is almost no livestock production. There are not enough horses produced locally to meet the farm demands. Good sized farm horses cost $350 to $400 each. Labor is scarce and high priced. There is now no very marked extension of the industry going on. There is also very little diversity in farm practice.

Huntley.

ALKALI SALTS IN THE SOILS OF THE WORDEN TRACT.

In connection with the investigations relating to the reclamation of the Worden Tract, on the Huntley Project, bridge readings to determine the quantities of total salts present in the soil have been made during the past three years. In the spring of 1913 it was thought desirable to supplement these determinations by some chemical analyses so that the nature of the salts would be better understood.

A brief report of the results obtained with the crops grown in 1913 is given in the Weekly Bulletin for October 18. Most of the soil samples reported on below were obtained from the plats where these crops were grown.

At the time of the first soil sampling in 1913 — April 25 to May 2 — a total of 44 cores were taken for bridge readings. Each of these cores contained 6 sections, namely, 3, 6, 12, 24, 36 and 48 inch depths. Two cores were taken on each plat where the land had been cultivated or cropped, and 10 cores were taken from virgin soil adjoining the cultivated plats. For the analyses, the 44 cores were composited to 22 cores, so that each composite analyses contained a portion of each of

27 December, 1913.

Alkali experiment on Worden Tract (continued).

12 samples.

The analytical work was done by Mr. J. F. Breazeale, of the Bureau of Chemistry. The detailed results of the analyses are given in the first table. A trace of chlorine was found in each sample analysed, butno carbonates were found in any of them.

Plat	Cultivated or Virgin	Results in percent, of air dry soil.						
		Total solids	Ca O	Mg O	N O3	Na_2O	HCO_3	SO_4
M I-2	C	0.626	.184	.048	.0004	.028	.030	.579
M II-2	V	1.630	.160	.049	Tr	.493	.040	1.098
M I-5	C	0.943	.134	.045	.003	.220	.030	.643
M II-5	V	1.870	.306	.093	Tr	.378	.030	1.321
M I-7	C	1.522	.266	.069	.0003	.290	.030	1.070
M II-7	V	1.314	.185	.051	Tr	.318	.030	.919
M I-9	C	1.100	.186	.055	.0014	.225	.040	.769
M II-9	V	2.116	.276	.075	Tr	.540	.040	1.480
M I-11	C	1.088	.171	.052	.001	.237	.040	.764
M II-11	V	1.941	.260	.081	Tr	.476	.040	1.375
M I-13	C	1.199	.296	.052	.0003	.148	.030	.866
M I-14	C	1.032	.212	.046	.0004	.175	.030	.717
MI-15a	C	1.012	.282	.048	.001	.089	.030	.725
M I-15c	C	1.193	.264	.052	.001	.178	.030	.864
M I-16a	C	1.078	.246	.054	. Tr	.141	.030	.757
M I-16c	C	0.547	.169	.043	.0008	.008	.030	.399
M I-17a	C	0.972	.256	.045	.0012	.099	.030	1.098
M I-17c	C	0.524	.167	.049	Tr	.000	.030	.375
M I-18a	C	1.355	.274	.051	.Tr	.236	.030	.541
M I-18c	C	0.967	.272	.048	.0012	.080	.030	.688
M I-19a	C	1.334	.256	.058	Tr	.245	.030	.929
M I-19c	C	1.086	.301	.054	.0004	.094	.030	.774
Average, 22 composites.....		1.202	.2328	.055	.00055	.213	.032	.852

27 December, 1913.

Alkali experiment on Worden Tract (continued).

As the alkali was found to be chiefly a mixture of the sulphates of sodium, calcium and magnesium, it was calculated to these salts. The results are given in the second table.

Plat	Cultivated or Virgin	Results in percent of air dry soil. Total solids	Na_2SO_4	$CaSO_4$	$MgSO_4$
M I-2	C	0.626	.065	.446	.143
M II-2	V	1.630	.130	.388	.146
M I-5	C	0.943	.504	.325	.134
M II-5	V	1.870	.865	.742	.277
M I-7	C	1.522	.665	.645	.206
M II-7	V	1.314	.729	.448	.152
M I-9	C	1.100	.515	.451	.164
M II-9	V	2.116	1.238	.670	.222
M I-11	C	1.088	.542	.415	.155
M II-11	V	1.941	1.091	.631	.242
M I-13	C	1.199	.339	.718	.155
M I-14	C	1.032	.400	.514	.136
M I-15a	C	1.012	.205	.684	.143
M I-15c	C	1.193	.407	.641	.155
M I-16a	C	1.078	.323	.597	.161
M I-16c	C	0.547	.018	.410	.128
M I-17a	C	0.972	.228	.621	.134
M I-17c	C	0.524	.000	.405	.147
M I-18a	C	1.355	.540	.665	.152
M I-18c	C	0.967	.183	.660	.143
M I-19a	C	1.334	.556	.621	.173
M I-19c	C	1.086	.215	.730	.161
Average, 22 composites.....		1.202	.489	.5648	.1649

Summaries of the above data, in which the results obtained from the cultivated soil are separated from those obtained from the virgin soil, are given in the third and fourth tables.

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Alkali experiment on Worden Tract (continued).

Soil	No. of cores	No. of composites	Average Results, in percent of air dry soil. Total solids	CaO	MgO	NO_3	Na_2O	HCO_3	SO_4
Cultivated..	34	17	1.034	.2315	.0511	.00073	.1465	.0312	.7387
Virgin	10	5	1.774	.2374	.0698	. Tr .	.4410	.0360	1.2386

Soils	No. of cores	No. of composites	Average results, in percent of air dry soil. Total solids	Na_2SO_4	$CaSO_4$	$MgSO_4$
Cultivated..	34	17	1.034	.3356	.5616	.1523
Virgin	10	5	1.774	1.0106	.5758	.2078

In October, 1912, a few soil samples were taken from "bad spots" on the tract by Professor Burke, of the Montana Experiment Station. Four cores were taken, the depths being 1, 4, 5 and 6 feet, and divided into foot sections. The analyses of the 16 samples gave the following average results, as reported by Professor Burke:

Na_2SO_4.....	1.1284 percent.
Na_2CO_3.....	0.02848 "
NaCl.....	0.01956 "

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Alkali experiment on Worden Tract (continued).

SUMMARY.

1. Analyses were made in 1913 of 22 composite samples, consisting of 44 four-foot cores which contained 264 original samples. These samples were taken April 25 to May 2, 1913, from Fields M I and M II. Five composite samples (10 cores) were from virgin soil, and 17 composite samples (34 cores) were from soil which had been subjected to various soil treatments for two seasons.

2. The average total salt content was 1.202 percent of the air dry soil.

3. No carbonates were found in any of the samples.

4. A trace of chlorine was found in each sample.

5. An average of 0.032 percent of bicarbonate was present.

6. Practically all the alkali consisted of the sulphates of sodium, calcium and magnesium, the percentage of these salts present being 0.489, 0.5648, and 0.1649, respectively.

7. The average total salt content of the virgin soil was 1.774 percent, while that of the soil which had received various treatments was 1.034 percent.

8. The soil which has received treatment contained smaller quantities of all the salts determined except nitrates, which were present in somewhat higher quantities in the treated soil.

9. The greatest difference between the virgin soil and cultivated soil was found in the sodium sulphate content, which was three times as high in the virgin soil as in the other; the calcium sulphate content differed but little (0.0142 percent) and a difference of 0.0555 percent was found in the magnesium sulphate content.

10. The samples analysed at the Montana Station contained small quantities of both carbonates and chlorides, and about 2.5 times as much sodium sulphate as the samples taken in 1913. These differences are probably due largely to the fact that the samples analysed at the Montana Station were from specially selected "bad spots", while the 1913 samples were more nearly representative of average conditions on the tract. A further possible cause of the difference is the fact that the first samples were taken in the fall, while the 1913 samples were taken in the early spring.

F. D. F.

27 December, 1913.

FIELD NOTES.

Truckee-Carson.

During the week ending December 13, the maximum temperature was 53, minimum 15.

A total of 500 feet of 10-inch drain tile was laid during the week. The method employed is to lay a line of 1" x 6" pine boards along the bottom of the ditch on which to rest the tile. By doing this, a perfect grade is maintained, which could not well be done by laying the tile directly on the bottom of the ditch, especially in those places where the bottom is soft and muddy or consists of quicksand. Strips of 1-ply tarred roofing paper 6x15" are used to cover the cracks of the tile on top so as to prevent earth from falling in or being washed into the tile.

The work of analyzing the soils in each of the 23 plats of the "Y" series for the alkali salts has been begun. Six borings of 3 samples each will be made in each plat. This will mean that 414 samples must be analysed. An assistant who can do chemical work will be needed at once in order to get these analyses made before any special treatments, such as the application of manure, gypsum, or sulphuric acid, are given.

A local paper announces the closing of the 1913 campaign of the sugar factory. The campaign lasted 34 days, during which about 11,000 tons of beets were handled. A total of about $66,000 was paid to the farmers for the beets, the average price being approximately $6 a ton. The season's output consisted of 25,172 bags of white sugar, 800 tons of molasses, and 4,500 tons of pulp. The average sugar content was 15.54 percent and the average purity was 79.3 percent, as compared with an average sugar content of 18.6, and an average purity of 82 in 1912. Plans are being made and growers' contracts are being drawn for the 1914 campaign.

27 December, 1913.

FIELD NOTES.

Truckee-Carson (continued).

Effect of Frequent Flooding and Gypsum on Carbonates and Total Salts.

Plats 7, 9 and 11, Field E, were leveled during the winter of 1910 and 1911, but on account of the large amount of alkali appearing on the surface, no crops were planted in 1911 and 1912.

Single borings were made to a depth of three feet on June 22, 1911, at the centers of Plats 7, 9 and 11. The total percentage of alkali was determined by means of bridge readings and a test was made with Phenolthalein for the presence of carbonates. In the table below, the presence of carbonates is indicated by the letter "P". A trace is indicated by "T", and no carbonates by "O".

Plat	Depth to ground Water	Total salts, percent.				Carbonates.		
		1st ft.	2nd ft.	3rd ft.	Average	1st	2nd	3rd
	(inches)							
7	36	0.580	2.790	2.130	1.830	P	O	T
9	30	0.280	0.310	T	0.200	P	P	T
11	36	0.190	0.830	0.510	0.510	P	P	P
Average	34	0.350	1.310	0.880	0.850			

During 1911 and 1912 these plats were frequently flooded. The water was not drained off but was allowed to stand until it had disappeared because of evaporation, and by soaking down through the soil. The dates of these floodings were not recorded. It was noticed that the water did not pass readily downward, but remained for the most part on the surface until evaporated.

27 December, 1913.

FIELD NOTES.

Truckee-Carson (continued).

In the fall of 1912 about 2 tons per acre of gypsum was applied and disked in. In 1913 the field was again frequently flooded, and it was noticeable that the water disappeared more quickly than in 1911 or 1912. No crop was planted in 1913.

On November 6, 1913, ten borings were made to a depth of three feet, at points equally distributed over the three plats. The soil was analysed by titration. The total percent of salts for each foot and the average for each 3-foot core are given in the table below. Carbonates were found only in the second foot of boring I.

	Total salts, percent			
Core	1st. ft.	2nd. ft.	3rd. ft.	Average.
1	.180	.258	.182	.207
2	.190	.400	.424	.338
3	.182	.310	.296	.263
4	.144.	.341	.250	.245
5	.155	.222	.410	.262
6	.150	.270	.405	.275
7	.160	.282	.500	.314
8	.142	.190	.220	.184
9	.097	.150	.164	.137
10	.110	.140	.102	.117
Average....	.151	.256	.295	.234

A study of these results indicates that the percentage of carbonates has been reduced, and that the total percentage of salts has been lowered. The salt content is not now so great but that some alkali-resistant crop, such as Japanese Millet or Sweet Clover, can be planted.

Bicarbonates were presented in all samples taken, so it might be advisable to apply about one ton of gypsum per acre to prevent the future formation of carbonates.

FIELD NOTES.

San Antonio.

During the week ending December 13, the maximum temperature was 61, minimum 49, and the greatest daily range 21. Although practically the entire week was rainy, preventing field work of any kind, the total precipitation was only .62 inch.

PERSONAL.

Mr. Aune arrived in Washington the 15th of December.

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